



State of Utah

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Department of Administrative Services

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Executive Director

Division of Facilities Construction and Management

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## ADDENDUM NO. 3

Date: September 28, 2012

To: Contractors

From: Matthias Mueller

Reference: Ice Sheet Addition  
Weber County/WSU – Ogden, Utah  
DFCM Project No. 12265810

Subject: **Addendum No. 3**

Pages	Addendum Cover Sheet	1 page
	<u>Architect's Addendum No. 3</u>	<u>41 pages</u>
	Total	42 pages

**Note:** *This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.*

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

**3.1 SCHEDULE CHANGES:** There are no Project Schedule changes.

**3.2 GENERAL ITEMS:**

3.2.1 A **non-mandatory** site visit is scheduled for Tuesday, October 2, 2012 at 1:30 PM. The architect and a representative from Weber County will be in attendance. This will allow contractors/subcontractors access to areas of the facility which are not open to the public.

3.2.2 See attached Architect's Addendum No. 3 dated September 28, 2012.

## **ADDENDUM NO. 3**

TO THE DRAWINGS AND PROJECT MANUAL FOR

The Ice Sheet Addition  
4390 Harrison Blvd.  
Ogden, Utah

Construction Documents dated 9/04/2012

DFCM Project No. 12265810  
FFKR Project No. 11124

PREPARED BY:

FFKR ARCHITECTURE  
730 Pacific Avenue  
Salt Lake City, Utah 84104

September 28, 2012

This Addendum No. Three, issued September 28, 2012 is for all persons preparing Bids for the above named project; and, as such, shall be made a part of the Contract Documents. Changes, corrections, and deletions enumerated herein shall be included in the Contractor's Bid. Bidders should acknowledge receipt of this Addendum in the space provided on the Contractor's Bid Form. Failure to do so may subject the Bidder to disqualification. In case of any conflict between the drawings, specifications, and this addendum, this addendum shall govern.

This Addendum consists of this cover sheet, 5 pages related to Architectural and Electrical Project Manual changes; Structural and Electrical Drawing changes; Responses to specific questions not requiring document changes, and Electrical Product Prior Approvals, 1 new specification section, 1 re-issued specification section, 1 new drawing detail, and 3 re-issued drawing sheets.

## REVISIONS TO THE PROJECT MANUAL

### SECTION 03 3000 – CAST-IN-PLACE CONCRETE -

1. Page 8, Paragraph 2.9.A; Modify to read as follows: “A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic lithium **or sodium** silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
2. Page 8, Paragraph 2.9.A.1; Add the following: “c. Curecrete Distribution Inc.; Ashford Formula.

### SECTION 06 4116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

1. Page 3, Paragraph 2.1.A; Add the following: “6. Johnson Brothers Planing Mill Inc.”

### SECTION 07 2100 - THERMAL INSULATION

1. Page 4, Paragraph 2.1.A; Delete paragraph A and all its subparagraphs and sub-subparagraphs.
2. Page 4, Paragraph 2.10.A; Add the following to article 2.10:
  - A. Foil-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 1, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Atlas Roofing Corporation.
      - b. Dow Chemical Company (The).
      - c. Hunter
      - d. Rmax, Inc.
    2. Minimum R-Value at Cavity Walls: 20.

### SECTION 07 2726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

1. Page 3, Paragraph 2.3.A.1.a; Add the following: “4). Carlisle Coatings & Waterproofing Inc.; Barritech VP.

### SECTION 07 5419 - POLYVINYL-CHLORIDE (PVC) ROOFING

1. Replace section with revised section. (See attachment.)

#### SECTION 07 9500 - EXPANSION CONTROL

1. Page 4, Paragraph 2.3.E.1; Modify paragraph 1 to read as follows: Basis-of-Design Product: Wabo FinishSeam Series FSW as provided by Watson Bowman Acme Corp.; a BASF Construction Chemicals business.
2. Page 4, Paragraph 2.3.F.1; Modify paragraph 1 to read as follows: Basis-of-Design Product: Wabo FinishSeam Series FSW as provided by Watson Bowman Acme Corp.; a BASF Construction Chemicals business.
3. Page 4, Paragraph 2.3.G.1; Modify paragraph 1 to read as follows: Basis-of-Design Product: Wabo FinishSeam Series FSC as provided by Watson Bowman Acme Corp.; a BASF Construction Chemicals business.

#### SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1. Page 5, Paragraph 2.1.G; Delete paragraph G and subparagraph 1.

#### SECTION 08 4229 - SLIDING AUTOMATIC ENTRANCES

1. Page 4, Paragraph 2.2.C; Delete paragraph C.
1. Page 5, Paragraph 2.3.B.1.a; Add subparagraph 6) as follows: "6) record-usa."
2. Page 9, Paragraph 2.10.A; Modify to read as follows: "A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class II, 0.010 mm or thicker. Match finish of aluminum storefront system."

#### SECTION 08 8000 - GLAZING

1. Page 5, Paragraph 2.2.C; Delete paragraph C and subparagraph 1.
2. Page 9, Paragraph 2.11.B; Modify to read as follows: "B. Clear insulated glass.
3. Page 9, Paragraph 2.11.B.7; Delete paragraph 7.

#### SECTION 09 6566 - RESILIENT ATHLETIC FLOORING

1. Page 3, Paragraph 2.1.A; Add the following as an approved manufacturer: "1. Dynamic Sports Construction, Inc.; DynaTuff-SP".
2. Page 3, Paragraph 2.2.A; Add the following as an approved Manufacturer: "1. Dynamic Sports Construction, Inc.; DynaFit"

#### SECTION 28 3111 – DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

1. Add new specification section. (See attachment)

### **REVISIONS TO THE DRAWINGS.**

#### SHEET S-102 – LEVEL 2 FLOOR FRAMING PLAN – Revised sheet included in addendum

1. Added composite joist in clouded area.

#### SHEET S-601 – STRUCTURAL SCHEDULES - Revised sheet included in addendum

1. Added footings to Concrete Footing Schedule.

SHEET S-803 – JOIST LOAD DIAGRAMS - Revised sheet included in addendum

1. Added joist loading diagram and modified point loads on A4/S-803
2. Added joist loading and modified line loads on D2/S-803.

SHEET ES101 – ELECTRICAL SITE PLAN

1. Light Pole in center of parking lot to be removed and returned to owner. All wiring and conduit to be disconnected and removed back to source. Refer to Sheet AD100 for exact fixture location.
2. Pole Light near entrance is existing to remain and should be indicated as such with Keyed Note #1.

SHEET EL101 – LEVEL 1 LIGHTING PLAN

1. Fixtures in lobby to be tied into existing circuit and controls.

SHEET EL102 – LEVEL 2 LIGHTING PLAN

1. Add wall mount occupancy sensor to Janitor Room 215 for lighting control.
2. Fixtures are controlled through Lighting Control Panel. There are not day lighting controls designed in this project.

SHEET EG600 – ELECTRICAL SCHEDULES

1. Fixture type 'D3' should be added to fixture schedule. Description should read "LED Downlight, 6" aperture 1500 Lumen, dimmable." Catalog No: ALED 35/18 6AR MVOLT or approved equal.
2. Fixture type 'FL1' should be: In-grade flush mount in description, and in-grade in mounting.
3. Fixture type 'P1', shoebox style LED area light should be renamed to 'PE1'

FA500 – FIRE ALARM DETAILS

1. See attached revised fire alarm riser diagram to show how the new fire alarm system connects/interacts with the new voice evacuation fire alarm system.

**RESPONSES TO SPECIFIC QUESTIONS**

1. 1. Sheet AD-100 shows stair demolition of 6'-4" going to the concourse level (main entrance on the southwest corner). The elevation change from the main entrance to the bottom of the proposed footings is approximately 20 feet. Please clarify if the contractor is allowed to remove the stairs and stair landings entering the building to provide a safe excavation slope per OSHA or if the contractor is required to shore the drastic elevation change at the existing building entrance stairs.

**RESPONSE:** The 6'-4" dimension is not an absolute maximum dimension. More of the existing spectator entry stairs and landings may be removed and replaced to allow for construction of the footings. However a minimum of 90 inches of exit width is required to be maintained during construction from the existing main spectator entrance at the Concourse Level.

2. Sheet CU-100, reference note 11 states the existing water line to be rerouted as part of ice sheet no. 2 construction. Reference note 23 says to provide a temporary bypass during construction to allow for relocation of the water meter and vault. Please confirm that the elevation of the existing water line is below the proposed elevation of the footings and slab. If the elevation of the existing waterline is above the depth of the excavation, a new temporary water line will need to be installed below grade to allow uninterrupted use of water in the existing facility.

**RESPONSE:** It is reasonable that much of the existing water line is below the floor slab but not necessarily at the south portion. We did not pot hole the line and the exact location horizontally is not known beyond the location of the water meter. The intent is to provide a bypass at the meter as a minimum to allow the reuse of the meter set. The actual coordination of footing construction and the location of the water line through the construction zone will need to be verified in the field.

3. Please confirm that the depth of the existing sewer main is below the footing at grid B.5 and 5.

**RESPONSE:** To the best of our knowledge, the pipe is below the footing depth, however this will need to be field verified during construction.

### **ELECTRICAL PRIOR APPROVALS**

The following manufacturers, trade names and products are allowed to bid on a name brand only basis with the provision that they completely satisfy all and every requirement of the drawings, specifications and all addenda shall conform to the design, quality and standards specified, established and required for the complete and satisfactory installation and performance of the building and all its respective parts.

<b><u>Item</u></b>	<b><u>Manufacturer</u></b>	<b><u>Comments</u></b>
F1	Lighting Alternatives HE Williams	Approved with wireguard Approved
F1A	Lighting Alternatives HE Williams	Approved Approved
F2	New Star Lighting HE Williams	Approved Approved
F3	New Star Lighting HE Williams	Approved Approved
F4	Columbia HE Williams	Rejected Approved
F5	Columbia HE Williams	Approved Approved
F6	Columbia	Approved

F7	HE Williams Columbia	Approved with Program Start Ballast	Approved
D1	HE Williams Prescolite		Approved
D2	HE Williams Focal Point		Approved
D3	HE Williams HE Williams		Approved
P1	V2 Luminis		Approved
T1	L.S.I. Timesquare	Approved with dimming	Approved
BL1	Kim HE Williams		Approved
FL1	Kim LSI	Approved with rounded top	Approved
EX1	Dual-Lite Exitronix		Approved
EX2	Dual-Lite Exitronix		Approved
WP1	Prescolite Juno		Approved
WP2	SSL Hubbell		Approved
P1	Beta U.S, Architectural	Approved – Provide 18' SSS Pole	Approved
	LSI	Approved – Provide 18' SSS Pole	Approved
	Lumark	Approved – Provide 18' SSS Pole	Approved
	Beta		Approved

Controls:  
Bantam X  
Greengate

## SECTION 07 5419 - POLYVINYL-CHLORIDE (PVC) ROOFING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:

1. Fully adhered PVC membrane roofing system over insulation.
2. Roof insulation of thicknesses required to achieve R-30 rating unless otherwise noted.
3. Walkway pads to all roof mounted equipment from roof access points
4. **20** year NDL warranty.

- B. **Construct roof free** of non-draining areas, with positive slope to drain, under all conditions. Acceptance by the manufacturer of such standing water areas, low spots, wrinkles or other conditions that retain water under their existing guidelines shall have no bearing on the Architect or Owner's requirements to accept conditions that are deemed not to be acceptable. Such defects that create areas not suited to free drainage shall be cause for rejection of the installation until corrected.

1. Factory fabricated components may require modification to achieve positive drainage, to comply with specific project requirements for dimensional limitations and slopes to drain.

- C. The work of this Section will comply with standards established by the DFCM and Weber State University.

- D. Related Sections include the following:

1. Section 06 1053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 07 6200 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings and rain drainage as work of this Section.
3. Section 07 9200 "Joint Sealants."

#### 1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
  - 1. Base flashings and membrane terminations.
  - 2. Tapered insulation, including slopes.
  - 3. Insulation fastening patterns.
  - 4. Roof sump detail showing coordination with roof drains.
- C. Samples for Verification: For the following products:
  - 1. 12-by-12-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
  - 1. Submit pre-installation notice from manufacture prior to start of Work. Include the following:**
    - a. Confirmation that membrane and accessories comply with specifications.**
    - b. Confirmation that scope of Work is in accordance with published technical data as per manufacture.**
    - c. Confirmation that warranty has been requested and will be issued on DFCM manufacture warranty form at completion of roofing.**
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
  - 1. Submit evidence of meeting performance requirements.
- C. Qualification Data: For Installer and manufacturer.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- E. Research/Evaluation Reports: For components of membrane roofing system.
- F. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Warranties: Special warranties specified in this Section.

- B. Maintenance Data: For roofing system to include in maintenance manuals.
- C. DFCM Required Roofing Closeout Documents: Require Installer to submit the following documents (**available from DFCM**) to project manager at completion of roofing Work. Project manager shall submit these documents to the roofing program manager. Keep copy of these documents in project file and delivered to agency.
  - 1. DFCM Manufacture Roofing Warranty
  - 2. DFCM 5-year Contractor Warranty.
  - 3. DFCM Roofing History Record.
  - 4. Roof Warranty Sign – See Roofing Design Requirements for details.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty prior to receipt of bids.
  - 1. A minimum of 15 years experience is required on similar sized projects.
- B. **Manufacturer Qualifications: A qualified firm listed in NRCA's low slope roofing materials guide, with a 10-year successful history as a roofing manufacture, that is approved by DFCM and that can show documented proof of how they intend to meet warranty obligations. Must be provided in contractor's submittal package.**
  - 1. **Manufacture must agree to and be willing to sign indicated State of Utah (DFCM) manufactures warranty for the roof system. The DFCM warranty, not the manufactures standard warranty, will be required at project completion.**
  - 2. **Manufacture must have a certified installer/contractor program. This program must include continuing education for the contractor.**
  - 3. **Manufacture must have a history of meeting Warranty obligations.**
  - 4. **Manufacture is required to release all inspection reports concerning warranted roof system to contractor to submit to architect.**
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain components for membrane roofing system from or approved by roofing membrane manufacturer.
- E. Observation and Documentation: Roofing application is to be observed, a minimum of 2 visits per month, by the roof membrane manufacturer or consultant trained and approved by the membrane manufacturer. Observations are to include documentation of correct installation of the roof assembly.
  - 1. An employee of the roof installer will not qualify to conduct project monitoring.
  - 2. Monitoring expenses are to be included in the roof installation cost.
  - 3. **Require manufacture to provide, at no additional cost to owner, start up meeting, progress inspections, and a final warranty inspection at project completion by a full time technical representative.**

- F. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- G. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
1. Meet with Owner, DFCM Roofing Program Manager, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  5. Review conditions of sloped deck and tapered insulation to confirm that no flat spots exist in the installation.
  6. Review structural loading limitations of roof deck during and after roofing.
  7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  8. Review requirements of existing membrane to maintain warranty in effect at time of work.
  9. Review governing regulations and requirements for insurance and certificates if applicable.
  10. Review temporary protection requirements for roofing system during and after installation.
  11. Review roof observation and repair procedures after roofing installation.
- H. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  5. Review structural loading limitations of roof deck during and after roofing.
  6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. **Store elevated off ground or roof deck. Do not use factory wrap as protective cover material.** Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

#### 1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

#### 1.10 WARRANTY

- A. Special Warranty: DFCM's standard Single Ply Warranty form, (attached to the end of this section) without NDL monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
  1. **Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, walkway products, and other components of membrane roofing system. Warranty shall specify minimum 90 mile per hour wind speed coverage.**
  2. Warranty Period: **20** years from date of Substantial Completion.
- B. **Special Project Warranty: DFCM's standard Roofing Contractor's Warranty form, obtained from DFCM and signed by Installer, covering the Work of this Section, including all components of membrane roofing system, for the following warranty period:**

**1. Warranty Period: Five years from date of Substantial Completion.**

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
1. **Where manufacturer's standards show one or more possible approaches for compliance with standards, provide the most stringent approach.**
  2. **If discrepancies exist between or within the contract documents, the more stringent requirement will be enforced.**
  3. **Comply with ASTM D 4434 for minimum standard linear dimensional change and for heat aging.**
  4. **Comply with ASTM D 5635 minimum standard for dynamic impact resistance.**
  5. **Comply with ASTM D 2136 minimum standard for low temperature flexibility.**
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
1. All products to comply with UL P717 or other 1 hr UL roof assembly pre-approved prior to bid.
  2. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
  3. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.
  4. **Do not use materials that contain asbestos.**
- D. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
1. Fire/Windstorm Classification: Class 1A-90.
  2. **Design roofing for 90 m.p.h. minimum wind speed.**
- E. **Energy Star Listing: Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.**

## 2.2 MANUFACTURES AND INSTALLERS

- A. Consult current DFCM list of approved Manufacturers and Installers.

## 2.3 ROOFING MEMBRANE

- A. PVC Sheet: ASTM D 4434, Type III, ~~liquid coated, acrylic coated~~, fabric reinforced, **sheets with stable or low-migrating plasticizers and minimum of 10 year successful performance on projects similar in scope. Minor formulation changes are acceptable as long as the membrane has a successful history.** ~~Membrane must be manufactured by the company supplying the warranty (no private labeling) with a minimum 20-yr successful track record in the same geographical area.~~

- 1. **Use membrane with low-wicking scrim.**
  - 2. **Provide balanced membrane with scrim near center of membrane and with no less than 27 mils polymer above scrim.**

- B. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work. Only manufacturers that can comply with ALL of the following material performance descriptions will be considered. Manufacturers must be able to prove conformance to the performance criteria on each item or they will be rejected.

- 1. Thickness: **60 mils, nominal, but not less than 57 mils actual thickness.** ~~with a minimum of 46 mils above reinforcing layer and a 30-year membrane warranty~~
  - 2. Exposed Face Color: White.

## 2.4 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
  - 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, and color as sheet membrane.
  - 1. Thickness may only be modified as required to turn 90 degree corners with membrane without crazing or cracking the face of the membrane
- C. Bonding Adhesive: Manufacturer's standard bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.
- D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- E. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

## 2.5 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, **that are covered under the DFCM manufacture warranty, and** selected from manufacturer's standard sizes and of thicknesses indicated.
  - 1. **Provide insulation approved and documented as UL rated assembly that meets code requirements of building roofing system.**
  - 2. **Provide insulation with Long Term Thermal Resistance (LTTR) that meets current code and requirements of the building.**
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
  - 1. Available Manufacturers include the following:
    - a. Atlas Roofing Corporation.
    - b. Carlisle SynTec Incorporated.
    - c. Firestone Building Products Company.
    - d. Hunter Panels, LLC.
    - e. Johns Manville International, Inc.
  - 2. Thickness: 4 inches minimum.
  - 3. R-Value: 28.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to a minimum slope of 3/8 inch per 12 inches. **Do not use EPS.**
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes at double the slope of main field of roof, where indicated for sloping to drain. Fabricate to slopes indicated.

## 2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation **and cover boards** to substrate, and acceptable to roofing system manufacturer.

- C. Insulation Adhesive: Insulation manufacturer's recommended cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- D. **Cover Board: One of the following:**
  - 1. **ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 5/8 inch thick, factory primed.**
    - a. **Products: Subject to compliance with requirements, provide one of the following:**
      - 1) **CertainTeed Corporation; GlasRoc Sheathing.**
      - 2) **Georgia-Pacific Corporation; Dens Deck.**
      - 3) **National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.**
      - 4) **USG Corporation; Securock Glass Mat Roof Board.**
  - 2. **ASTM C 1278/C 1278M, cellulosic-fiber-reinforced, water-resistant gypsum substrate, 1/2 inch thick.**
    - a. **Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:**
      - 1) **USG Corporation; Securock Gypsum-Fiber Roof Board**
- E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.
- F. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application to separate membrane from insulating substrate

## 2.7 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, open-grid, surface-textured, flexible PVC walkway mat, approximately 9/16 inch thick, and acceptable to membrane roofing system manufacturer. To be installed from roof access points to all roof mounted equipment, surrounding each roof mounted component and routed between all pieces of roof mounted equipment.
  - 1. Color: Gray.
  - 2. Size: 24 x 24 squares or 3 foot wide by 33 feet long rolls.
  - 3. Design Standard: Design Standards are used to establish a level of quality for the work. Premium products equal in quality of acceptable manufacturers may be used. The use of a Design Standard is not to be construed as a limit of competition or a constraint of trade.
    - a. Sarnafil Crossgrip Walkway Mat.
    - b. Carlisle ECO NOVA

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
  - 2. Verify that pressure treated wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify that surface plane flatness and fastening of steel roof deck comply with requirements in Section 05 3100 "Steel Deck."
  - 4. Verify that membrane shows no signs of abrasion, discoloration, or defects.
  - 5. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Employ roofer for repairing existing roof membrane as approved by the manufacturer, where warranties are still in effect for the existing assembly.
- E. **If specified requirements do not meet manufacture's requirements, install per manufacture requirements at no additional cost to Owner. Where any portion of the specifications exceeds manufacture minimum requirements, install according to specifications rather than manufacture minimum requirements.**

#### ~~3.3 VAPOR RETARDER INSTALLATION~~

- ~~A. Self Adhering Sheet: Place self adhering sheet in a single layer over area to receive vapor retarder, side lapping each sheet a minimum of 3 inches.
  - 1. Continuously seal side and end laps by rolling with roller to ensure adhesion to substrate~~
- ~~B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.~~

### 3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install multiple layers of insulation, joints staggered **in both directions**, under area of roofing to achieve required thickness.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Field trim factory formed units where required to provide slopes in crickets and drains.
- G. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type. Offset joints between layers.
  - 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
  - 2. Set each subsequent layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
  - 3. Set each subsequent layer of insulation in adhesive, firmly pressing and maintaining insulation in place.
- I. **Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.**
  - 1. **Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.**
  - 2. **Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.**

### 3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
  - 1. Install sheet according to ASTM D 5036.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
  - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- H. Roof Drains: Completely prime the lead drain flashing and allow to dry prior to installation. Set 36-by-36-inch 4# lead flashing in bed of asphalt roofing cement or approved adhesive. Cover metal flashing with a second ply of roofing membrane and extend a minimum of 6 inches beyond edge of metal flashing onto field of single ply roofing membrane. Terminate the second ply to extend beneath the clamping ring of the drain. Clamp roofing membrane, metal flashing, and second ply into roof-drain clamping ring.
  - 1. Install stripping according to roofing system manufacturer's written instructions.

### 3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Extend sheet flashings up and over parapet caps and secure to continuous nailer. Provide transitions at horizontal to vertical to support membrane and avoid any line that could craze or crack under foot traffic at the parapet
- F. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY MAT INSTALLATION

- A. Flexible Walkway Mats: Install walkway mat products in locations indicated, from hatches to roof-top mounted equipment. Secure to roofing membrane according to roofing system and walkway mat manufacturers' written instructions.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
  - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 5419

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## SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Air-sampling smoke detectors.
5. Heat detectors.
6. Notification appliances.
7. Device guards.
8. Firefighters' two-way telephone communication service.
9. Firefighters' smoke-control station.
10. Magnetic door holders.
11. Remote annunciator.
12. Addressable interface device.
13. Digital alarm communicator transmitter.

#### 1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. HLI: High Level Interface.
- D. NICET: National Institute for Certification in Engineering Technologies.
- E. PC: Personal computer.
- F. VESDA: Very Early Smoke-Detection Apparatus.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including furnished options and accessories.

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1. Include construction details, material descriptions, dimensions, profiles, and finishes.
2. Include rated capacities, operating characteristics, and electrical characteristics.

B. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
2. Include plans, elevations, sections, details, and attachments to other work.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
4. Detail assembly and support requirements.
5. Include voltage drop calculations for notification-appliance circuits.
6. Include battery-size calculations.
7. Include input/output matrix.
8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
9. Include performance parameters and installation details for each detector.
10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
11. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
12. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
  - a. Trained and certified by manufacturer in fire-alarm system design.
  - b. NICET-certified, fire-alarm technician; Level III minimum.
  - c. Licensed or certified by authorities having jurisdiction.

1.5 Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
    - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

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- b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
- c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
- d. Riser diagram.
- e. Device addresses.
- f. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
- g. Record copy of site-specific software.
- h. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
  - 1) Equipment tested.
  - 2) Frequency of testing of installed components.
  - 3) Frequency of inspection of installed components.
  - 4) Requirements and recommendations related to results of maintenance.
  - 5) Manufacturer's user training manuals.
- i. Manufacturer's required maintenance related to system warranty requirements.
- j. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

B. Software and Firmware Operational Documentation:

- 1. Software operating and upgrade manuals.
- 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
- 3. Device address list.
- 4. Printout of software application and graphic screens.

## 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Keys and Tools: One extra set for access to locked or tamperproofed components.
  - 2. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

## 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.

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- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

#### 1.9 PROJECT CONDITIONS

- A. Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.
- B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
  - 1. Notify Architect no fewer than seven days in advance of proposed interruption of fire-alarm service.
  - 2. Do not proceed with interruption of fire-alarm service without Architect's written permission.
- C. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

#### 1.10 SEQUENCING AND SCHEDULING

- A. The existing zoned fire alarm system as manufactured by Notifier (system 5000) will remain in place and operational. The new system will be installed and interconnected using addressable relays and monitor module such that both the new and old systems will notify each other of their alarm status.
- B. Existing Fire-Alarm Equipment to be removed/replaced: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- C. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

#### 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
  - 2. Warranty Period: Five years from date of Substantial Completion.

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## PART 2 - PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. The existing fire alarm system is a zoned type System 5000 as manufactured by Notifier. The new voice evacuation fire alarm system in the addition shall be capable and U.L. listed to communicate via monitor module and addressable relay with this older fire alarm system.
- B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and voice/strobe evacuation.
- C. Automatic sensitivity control of certain smoke detectors.
- D. All components provided shall be listed for use with the selected system.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### 2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
  - 1. Manual stations.
  - 2. Heat detectors.
  - 3. Smoke detectors.
  - 4. Duct smoke detectors.
  - 5. Automatic sprinkler system water flow.
  - 6. Fire-extinguishing system operation.
  - 7. Fire standpipe system.
- B. Fire-alarm signal shall initiate the following actions:
  - 1. Continuously operate alarm notification appliances, including voice evacuation notices.
  - 2. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.
  - 3. Transmit an alarm signal to the remote alarm receiving station.
  - 4. Unlock electric door locks in designated egress paths.
  - 5. Release fire and smoke doors held open by magnetic door holders.
  - 6. Activate voice/alarm communication system.
  - 7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  - 8. Close smoke dampers in air ducts of designated air-conditioning duct systems.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
  - 1. Valve supervisory switch.
  - 2. Alert and Action signals of air-sampling detector system.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:

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1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
4. Loss of primary power at fire-alarm control unit.
5. Ground or a single break in internal circuits of fire-alarm control unit.
6. Abnormal ac voltage at fire-alarm control unit.
7. Break in standby battery circuitry.
8. Failure of battery charging.
9. Abnormal position of any switch at fire-alarm control unit or annunciator.
10. Voice signal amplifier failure.

E. System Supervisory Signal Actions:

1. Initiate notification appliances.
2. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
3. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.

## 2.3 FIRE-ALARM CONTROL UNIT

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Faraday.
2. Fike Corporation.
3. Fire-Lite Alarms.
4. GAMEWELL.
5. GE UTC Fire & Security; A United Technologies Company.
6. Mircom Technologies, Ltd.
7. Notifier.
8. Siemens Industry, Inc.; Fire Safety Division.
9. Silent Knight.
10. SimplexGrinnell LP.
11. Engineer approved equal.

B. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
  - a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
  - b. Include a real-time clock for time annotation of events on the event recorder and printer.

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- c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
    - d. The FACP shall be listed for connection to a central-station signaling system service.
    - e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
  2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
  3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.
- C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
  1. Annunciator and Display: Liquid-crystal type, two line(s) of 40 characters, minimum.
  2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- D. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
  1. Pathway Class Designations: NFPA 72, Class A.
  2. Install no more than 100 addressable devices on each signaling-line circuit.
  3. Serial Interfaces:
    - a. One dedicated RS 485 port for central-station operation using point ID DACT.
    - b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
    - c. One USB port for PC configuration.
    - d. One RS 232 port for voice evacuation interface.
- E. Smoke-Alarm Verification:
  1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
  2. Activate an approved "alarm-verification" sequence at fire-alarm control unit and detector.
  3. Sound general alarm if the alarm is verified.
  4. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.
- F. Notification-Appliance Circuit:
  1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
  2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or

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- 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.
3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.
- G. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.
- H. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided as a special module that is part of fire-alarm control unit.
1. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711.
    - a. Allow the application of, and evacuation signal to, indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
    - b. Programmable tone and message sequence selection.
    - c. Standard digitally recorded messages for "Evacuation" and "All Clear."
    - d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of fire-alarm control unit.
  2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
  3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.
- I. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals shall be powered by 24-V dc source.
1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- J. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
1. Batteries: Sealed lead calcium.
- K. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

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## 2.4 MANUAL FIRE-ALARM BOXES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Cooper Wheelock.
  2. Faraday.
  3. Federal Signal Corporation.
  4. Fike Corporation.
  5. Fire-Lite Alarms.
  6. GAMEWELL.
  7. GE UTC Fire & Security; A United Technologies Company.
  8. Mircom Technologies, Ltd.
  9. Notifier.
  10. Siemens Industry, Inc.; Fire Safety Division.
  11. Silent Knight.
  12. SimplexGrinnell LP.
  13. System Sensor.
  14. Engineer approved equal.
- B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
1. Double-action mechanism requiring two actions to initiate an alarm, breaking-glass or plastic-rod type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
  2. Station Reset: Key- or wrench-operated switch.
  3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

## 2.5 SYSTEM SMOKE DETECTORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Faraday.
  2. Fire-Lite Alarms.
  3. GAMEWELL.
  4. GE UTC Fire & Security; A United Technologies Company.
  5. Gentex Corporation.
  6. Mircom Technologies, Ltd.
  7. Notifier.
  8. Siemens Industry, Inc.; Fire Safety Division.
  9. Silent Knight.
  10. SimplexGrinnell LP.
  11. System Sensor.

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12. Engineer approved equal.

B. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be two-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.

C. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
5. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

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## 2.6 HEAT DETECTORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Faraday.
  2. Fire-Lite Alarms.
  3. GAMEWELL.
  4. GE UTC Fire & Security; A United Technologies Company.
  5. Gentex Corporation.
  6. Mircom Technologies, Ltd.
  7. Notifier.
  8. Siemens Industry, Inc.; Fire Safety Division.
  9. Silent Knight.
  10. SimplexGrinnell LP.
  11. System Sensor.
  12. Engineer approved equal.
- B. General Requirements for Heat Detectors: Comply with UL 521.
1. Temperature sensors shall test for and communicate the sensitivity range of the device.
- C. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
  2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
- D. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).
1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
  2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

## 2.7 NOTIFICATION APPLIANCES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Cooper Wheelock.
  2. Federal Signal Corporation.
  3. GE UTC Fire & Security; A United Technologies Company.
  4. Gentex Corporation.
  5. Mircom Technologies, Ltd.
  6. Siemens Industry, Inc.; Fire Safety Division.
  7. SimplexGrinnell LP.
  8. System Sensor.

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9. Engineer approved equal.
- B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
    1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.
  - C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.
  - D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.
  - E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
  - F. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
    1. Rated Light Output:
      - a. Candela rating as per the drawings.
      - b. 15/30/75/110 cd, selectable in the field.
    2. Mounting: Wall mounted unless otherwise indicated.
    3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
    4. Flashing shall be in a temporal pattern, synchronized with other units.
    5. Strobe Leads: Factory connected to screw terminals.
    6. Mounting Faceplate: Factory finished, red.
  - G. Voice/Tone Notification Appliances:
    1. Comply with UL 1480.
    2. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
    3. High-Range Units: Rated 2 to 15 W.
    4. Low-Range Units: Rated 1 to 2 W.
    5. Mounting: surface mounted and bidirectional.
    6. Matching Transformers: Tap range matched to acoustical environment of speaker location.
  - H. Exit Marking Audible Notification Appliance:

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1. Exit marking audible notification appliances shall meet the audibility requirements in NFPA 72.
2. Provide exit marking audible notification appliances at the entrance to all building exits.
3. Provide exit marking audible notification appliances at the entrance to areas of refuge with audible signals distinct from those used for building exit marking.

## 2.8 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnets: Require no more than 3 W to develop 25-lbf (111-N) holding force.
  2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
  3. Rating: 24-V ac or dc.
  4. Rating: 120-V ac.
- B. Material and Finish: Match door hardware.

## 2.9 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
1. Mounting: Flush cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

## 2.10 ADDRESSABLE INTERFACE DEVICE

- A. General:
1. Include address-setting means on the module.
  2. Store an internal identifying code for control panel use to identify the module type.
  3. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- C. Integral Relay: Capable of providing a direct signal.
1. Allow the control panel to switch the relay contacts on command.
  2. Have a minimum of two normally open and two normally closed contacts available for field wiring.

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- D. Control Module:
  - 1. Operate notification devices.
  - 2. Operate solenoids for use in sprinkler service.

## 2.11 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
  - 1. Factory fabricated and furnished by device manufacturer.
  - 2. Finish: Paint of color to match the protected device.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
  - 1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
  - 1. Devices placed in service before all other trades have completed cleanup shall be replaced.
  - 2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
  - 1. Connect new equipment to existing control panel in existing part of the building.
  - 2. Connect new equipment to existing monitoring equipment at the supervising station.

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3. Expand, modify, and supplement existing control/monitoring equipment as necessary to extend existing control/monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- C. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
- D. Manual Fire-Alarm Boxes:
1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
  2. Mount manual fire-alarm box on a background of a contrasting color.
  3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- E. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
  2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
  3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
  4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A in NFPA 72.
  5. HVAC: Locate detectors not closer than 36 inches (910 mm) from air-supply diffuser or return-air opening.
  6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- F. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- G. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.
1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- H. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- I. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

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- J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.

### 3.3 PATHWAYS

- A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.
  - 1. Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT.
- B. Exposed EMT shall be painted red enamel.

### 3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
  - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Magnetically held-open doors.
  - 2. Supervisory connections at valve supervisory switches.

### 3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

### 3.6 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

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### 3.7 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by Architect and authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
- D. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Visual Inspection: Conduct visual inspection prior to testing.
    - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
    - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
  - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
  - 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
  - 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
  - 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.
- H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

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### 3.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
  - 1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  - 2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  - 3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

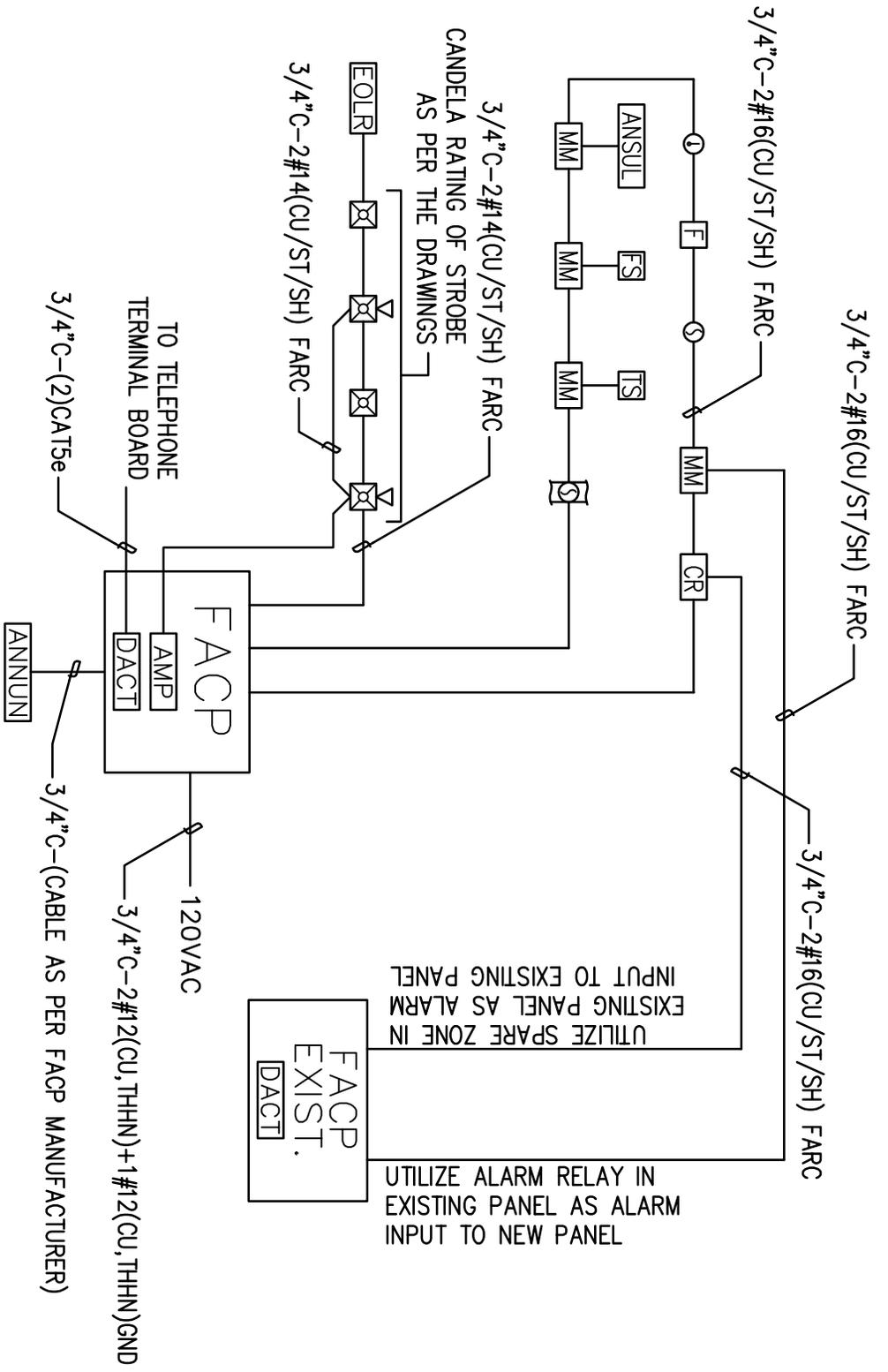
### 3.9 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.
- C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
  - 1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

### 3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111



3  
FA500  
SCALE: NONE

## FIRE ALARM RISER DIAGRAM

NOTE: ALL PREVIOUS GENERAL NOTES APPEARING ON THE FIRE ALARM RISER DIAGRAM ON SHEET FA500 STILL APPLY TO THIS RISER REVISION.

**FIRE ALARM RISER**

**FA500A1**

SHEET CONTENTS

VBFA PROJECT #:	11612	DWS	9/27/12
CHECKED BY:	BRT		
DRAWN BY:			
CURRENT/D DATE:			

### WEBER ICE SHEET NO. 2



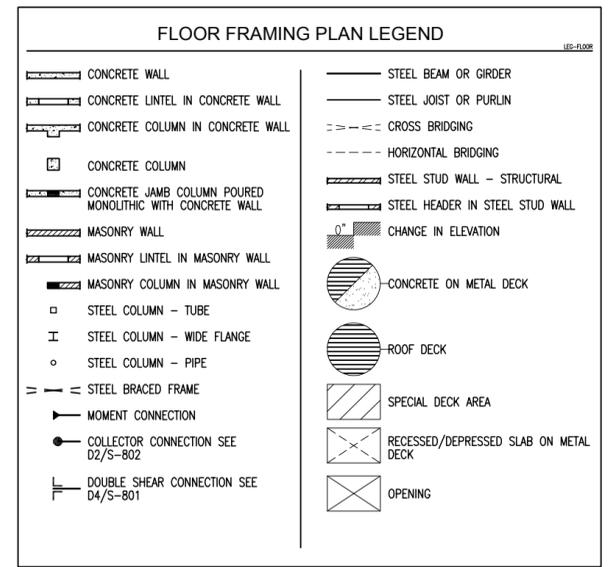
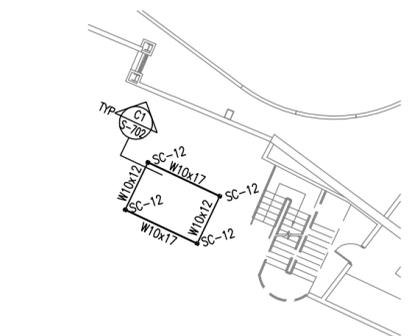
**VAN BOERUM & FRANK ASSOCIATES, INC.**  
CONSULTING ENGINEERS

WWW.VBFA.COM

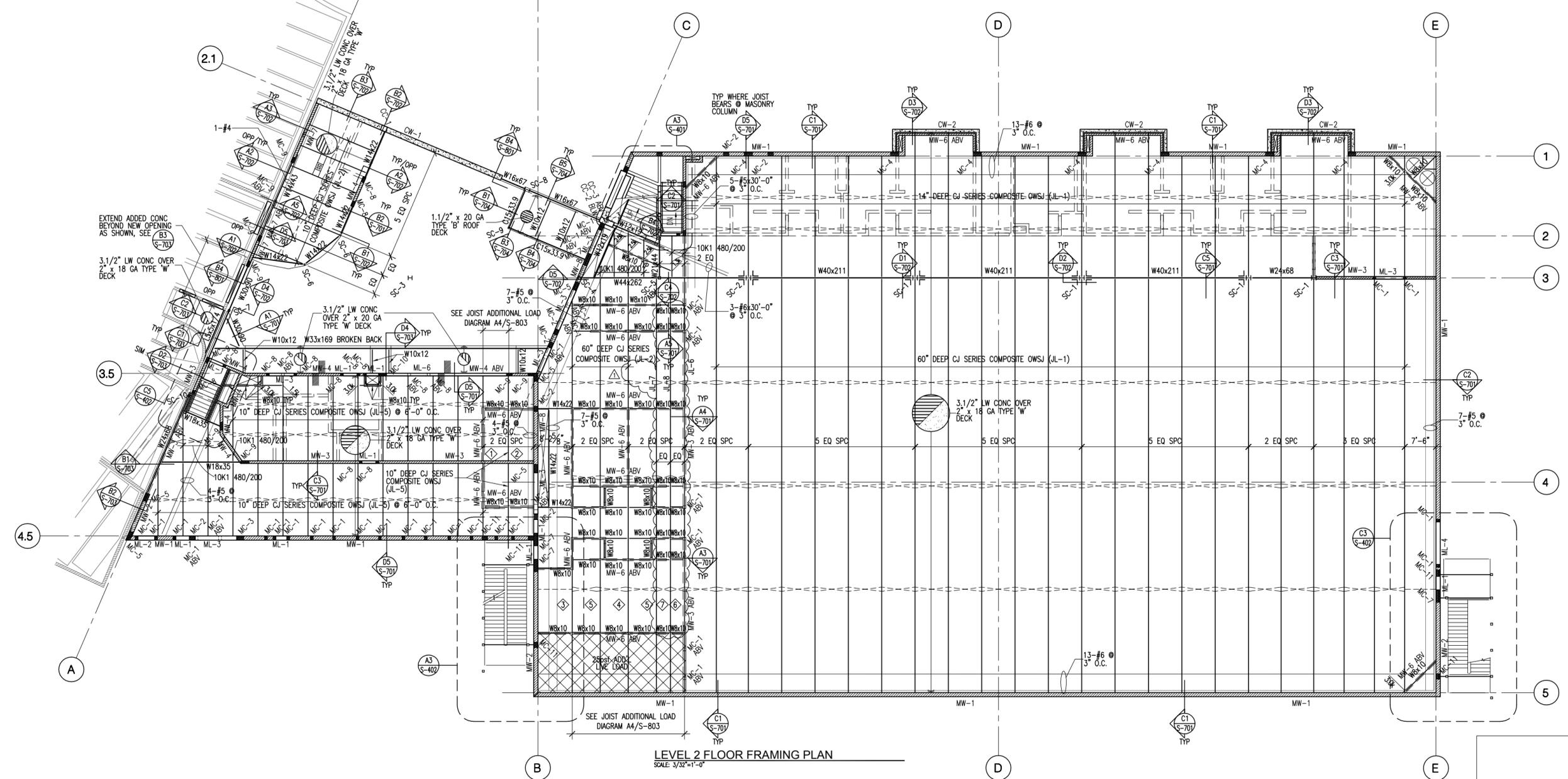
Salt Lake City • Logan • St. George • Tempe

330 South 300 East      801.530.3148 T  
Salt Lake City, UT 84111      801.530.3150 F

VBFA Project Number:11612



- ### FLOOR FRAMING PLAN NOTES
- SEE GENERAL STRUCTURAL NOTE (3.4.H) AND DETAILS B3/S-701 FOR CONTROL JOINTS IN SUSPENDED SLABS OVER STEEL DECK.
  - SEE DETAILS D1/S-701 FOR MISCELLANEOUS FLOOR OPENINGS.
  - SEE GENERAL STRUCTURAL NOTE (5.10.G) FOR STEEL DECK REQUIREMENTS WHERE 3-SPAN CONDITIONS ARE NOT POSSIBLE.
  - PROVIDE 4.1/2" LONG HEADED STUD ANCHORS ON COMPOSITE BEAMS IN THE AREAS OF 1" SLAB RECESSES.
  - #K ADD - INDICATES ADDITIONAL UPLIFT / DOWNWARD FORCE ON STEEL JOIST IN ADDITION TO REGULAR LOADS.
  - SEE DETAIL A1/S-703 FOR TYPICAL MASONRY COLUMN ABV MASONRY LINTEL.
  - THE JOIST MANUFACTURER IS RESPONSIBLE FOR THE DESIGN OF THE JOISTS, INCLUDING THE DESIGN OF SHEAR STUDS REQUIRED FOR COMPOSITE ACTION.
  - FOR BIDDING PURPOSES, ASSUME 5275-3/4" DIA HEADED STUDS ARE REQUIRED FOR THE COMPOSITE JOISTS.
  - JL-# INDICATES JOIST LOADING DIAGRAM. SEE D2/S-803.
  - SEE A2, A3 & A4/S-703 FOR TYPICAL NON BEARING MASONRY WALL BRACE DETAILS.



THE ICE SHEET ADDITION  
4390 HARRISON BLVD. OGDEN, UT 84403  
CONSTRUCTION DOCUMENTS

REGISTERED STRUCTURAL ENGINEER  
#170416  
JEFFREY THOMAS MILLER  
UTAH  
8/6/12

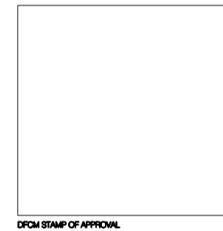
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08/27/12	ADDENDUM #1

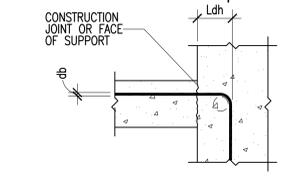
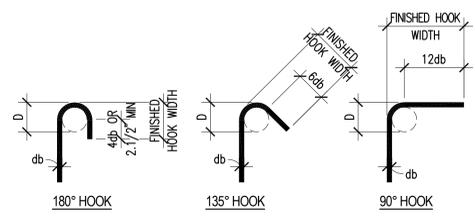
PROJECT NUMBER: 11124  
DRAWN BY: MK  
CHECKED BY: JTM

SCALE: NO SCALE

LEVEL 2 FLOOR FRAMING PLAN

S-102





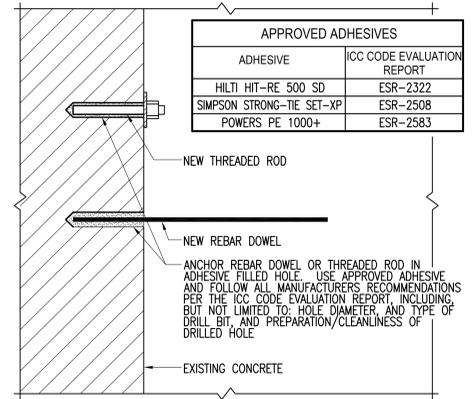
BAR SIZE	NORMAL WEIGHT CONCRETE, f'c = PSI				
	3,000	4,000	4,500	5,000	6,000
#3	6"	6"	6"	6"	6"
#4	8"	7"	7"	7"	7"
#5	10"	9"	8"	8"	7"
#6	12"	10"	10"	9"	8"
#7	14"	12"	11"	11"	10"
#8	16"	14"	13"	12"	11"
#9	18"	15"	14"	14"	13"
#10	20"	17"	16"	15"	14"
#11	22"	19"	18"	17"	16"
#14	37"	32"	31"	29"	27"
#18	50"	43"	41"	39"	35"

NOTES:  
 1. VALUES HERE VALID FOR ALL CASES IF: SIDE COVER ≥ 2 1/2" END COVER ≥ 2"  
 2. MULTIPLY VALUES IN SCHEDULE BY 1.2 FOR LIGHTWEIGHT CONCRETE.  
 3. MULTIPLY VALUES IN SCHEDULE BY 1.2 FOR USE WITH EPOXY COATED REBAR.

BAR SIZE	D	FINISHED HOOK WIDTH		
		180° HOOK	135° HOOK	90° HOOK
#3	2.1/4"	3"	3"	6"
#4	3"	4"	3"	8"
#5	3.1/4"	5"	3.3/4"	10"
#6	4.1/2"	6"	4.1/2"	12"
#7	5.1/4"	7"	5.1/4"	14"
#8	6"	8"	6"	16"
#9	9.1/2"	11.3/4"	--	19"
#10	10.3/4"	13.1/4"	--	22"
#11	12"	14.3/4"	--	24"
#14	18.1/4"	21.3/4"	--	31"
#18	24"	28.1/2"	--	41"

BAR SIZE	f'c = 3000 PSI				f'c = 4000 PSI				f'c = 4500 PSI				f'c = 5000 PSI				f'c = 6000 PSI				f'c = ALL						
	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb
#3	17"	22"	22"	28"	15"	19"	19"	25"	14"	18"	18"	23"	13"	17"	17"	22"	12"	16"	16"	20"	8"	12"					
#4	22"	29"	29"	38"	19"	25"	25"	33"	18"	24"	24"	31"	17"	23"	23"	29"	16"	21"	21"	27"	10"	15"					
#5	28"	36"	36"	47"	24"	31"	31"	41"	23"	30"	30"	38"	22"	28"	28"	36"	20"	26"	26"	33"	12"	19"					
#6	33"	43"	43"	56"	29"	37"	37"	49"	27"	35"	35"	46"	26"	34"	34"	44"	24"	31"	31"	40"	15"	23"					
#7	48"	63"	63"	81"	42"	54"	54"	71"	40"	51"	51"	67"	38"	49"	49"	63"	34"	45"	45"	58"	17"	27"					
#8	55"	72"	72"	93"	48"	62"	62"	81"	45"	59"	59"	76"	43"	56"	56"	72"	39"	51"	51"	66"	19"	30"					
#9	62"	81"	81"	105"	54"	70"	70"	91"	51"	66"	66"	86"	48"	63"	63"	81"	44"	57"	57"	74"	22"	34"					
#10	70"	91"	91"	118"	61"	79"	79"	102"	57"	74"	74"	96"	54"	71"	71"	92"	50"	64"	64"	84"	24"	39"					
#11	78"	101"	101"	131"	67"	87"	87"	114"	64"	82"	82"	107"	60"	78"	78"	102"	55"	71"	71"	93"	27"	43"					
#14	93"	121"	NA	NA	81"	105"	NA	NA	76"	99"	NA	NA	72"	94"	NA	NA	66"	86"	NA	NA	33"	NA					
#18	124"	161"	NA	NA	108"	140"	NA	NA	101"	132"	NA	NA	96"	125"	NA	NA	88"	114"	NA	NA	43"	NA					

NOTES:  
 1. DEFINITIONS:  
 Ld: TENSION DEVELOPMENT LENGTH FOR REINFORCEMENT SATISFYING THE FOLLOWING CONDITIONS: SLABS AND WALLS: CLEAR SPACING > 2db AND CONCRETE CLEAR COVER > db BEAMS AND COLUMNS: CLEAR COVER SPACING > db AND CONCRETE CLEAR COVER > db  
 Lt: DEVELOPMENT LENGTH FOR TOP BARS IN TENSION  
 Lsb: TENSION LAP SPlice LENGTH FOR OTHER THAN TOP BARS (CLASS B)  
 Lsbt: TENSION LAP SPlice LENGTH OF TOP BARS  
 Ldc: DEVELOPMENT LENGTH FOR BARS IN COMPRESSION  
 Lsc: TIED COLUMN LAP SPlice IN COMPRESSION  
 db: NOMINAL BAR DIAMETER (INCHES)  
 TOP BARS: HORIZONTAL BEAM REINFORCEMENT WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW  
 2. MULTIPLY VALUES IN SCHEDULE BY 1.5 IF CLEAR SPACING OR CONCRETE COVER DO NOT MEET REQUIREMENTS FOR Ld IN NOTE 1.  
 3. MULTIPLY VALUES IN SCHEDULE BY 1.3 FOR USE IN LIGHTWEIGHT AGGREGATE CONCRETE.  
 4. FOR EPOXY COATED BAR: MULTIPLY VALUES IN SCHEDULE BY 1.5 FOR BARS WITH CLEAR COVER < 3db OR CLEAR SPACING < 6db. OTHERWISE MULTIPLY VALUES BY 1.2.  
 5. a. FOR BUNDLED BARS OF THREE OR LESS MULTIPLY LENGTHS BY 1.2.  
 b. FOR BUNDLED BARS OF FOUR OR MORE MULTIPLY LENGTHS BY 1.33.  
 c. INDIVIDUAL BAR SPICES WITHIN A BUNDLE SHALL NOT OVERLAP. ENTIRE BUNDLES SHALL NOT BE LAP SPICED.  
 6. SCHEDULE LENGTHS ARE FOR fy=60ksi REINFORCING, MULTIPLY LENGTHS BY 1.25 FOR fy=75ksi REINFORCING.  
 7. LAP SPICES ARE NOT PERMITTED FOR #14 & #18 BARS. USE BAR COUPLERS PER G.S.N.



DOWEL SIZE	REINFORCING		THREADED ROD	
	EMBEDMENT LENGTH (SEE NOTE #2)	SIZE (DIA)	EMBEDMENT LENGTH (SEE NOTE #2)	SIZE (DIA)
#3	4"	3/8"	4.1/2"	6"
#4	6"	1/2"	6"	6"
#5	9"	5/8"	7.1/2"	9"
#6	10"	3/4"	9"	9"
#7	12"	7/8"	10.1/2"	12"
#8	13"	1"	12"	12"
#9	14"	1.1/4"	15"	15"
#10	18"			
#11	18"			

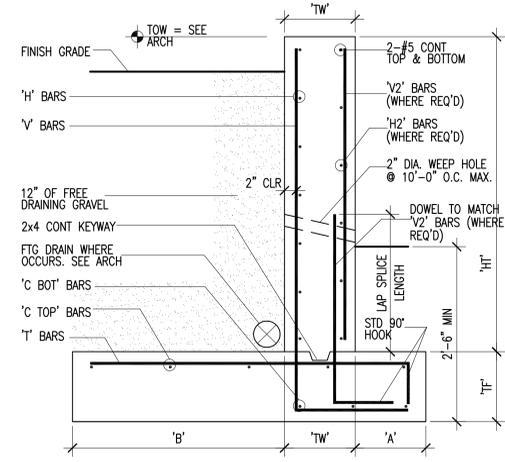
NOTES:  
 1. THIS SCHEDULE SHALL BE USED ONLY WHERE SPECIFICALLY REFERENCED ON THE DRAWINGS AND AT OTHER LOCATIONS WITH THE APPROVAL OF THE ENGINEER.  
 2. EMBEDMENT LENGTHS SPECIFIED ON PLANS OR DETAILS TAKE PRECEDENCE OVER EMBEDMENT LENGTHS IN THIS SCHEDULE.  
 3. WHERE THE THICKNESS OF THE EXISTING CONCRETE MEMBER IS NOT SUFFICIENT TO ACHIEVE SCHEDULED EMBEDMENT AND SPECIFIED CLEAR COVER FOR THE ANCHOR, CONTACT THE ENGINEER.  
 4. USE PROCEDURES AND PRODUCTS RECOMMENDED BY ADHESIVE MANUFACTURER FOR OVERHEAD INSTALLATION.  
 5. SPECIAL INSPECTION IS REQUIRED DURING INSTALLATION OF ALL ADHESIVE ANCHORS PER THE CODE EVALUATION REPORT FOR THE ANCHOR AND THE QUALITY ASSURANCE SECTION OF THE GENERAL STRUCTURAL NOTES.

MARK	WIDTH	LENGTH	THICK	CROSSWISE REINFORCING			LENGTHWISE REINFORCING			REMARKS	
				NO.	SIZE	SPACE	NO.	SIZE	SPACE		
FTS2.0	2'-0"	CONT.	12"	--	NONE	REQ'D	--	3	#4	CONT.	9"
FC2.0	2'-0"	CONT.	12"	--	NONE	REQ'D	--	3	#4	CONT.	9"
FC3.0	3'-0"	CONT.	12"	--	#5	2'-6"	14"	3	#5	CONT.	15"
FC4.0	4'-0"	CONT.	12"	--	#5	3'-6"	14"	4	#5	CONT.	14"
FC4.5	4'-6"	CONT.	13"	--	#5	4'-0"	13"	5	#5	CONT.	12"
FC5.0	5'-0"	CONT.	14"	--	#6	4'-6"	17"	4	#6	CONT.	18"
FC6.0	6'-0"	CONT.	15"	--	#6	5'-6"	18"	5	#6	CONT.	14"
FC6.5	6'-6"	CONT.	24"	--	#5	6'-0"	18"	5	#5	CONT.	18"
FC7.5	7'-6"	CONT.	36"	--	#6	7'-0"	18"	8	#6	CONT.	12"
FC8.0	8'-0"	CONT.	36"	--	#5	7'-0"	18"	8	#5	CONT.	12"
FC8.0	8'-0"	CONT.	36"	--	#6	7'-0"	12"	8	#6	CONT.	12"
FS3.0	3'-0"	3'-0"	12"	4	#4	2'-6"	10"	4	#4	2'-6"	10"
FS6.5	6'-6"	6'-6"	15"	8	#5	6'-0"	10.3"	8	#5	6'-0"	10.3"
FS12.5	12'-6"	12'-6"	28"	15	#7	12'-0"	10.3"	15	#7	12'-0"	10.3"
FS15.0	15'-0"	15'-0"	32"	17	#8	14'-6"	10.9"	17	#7	14'-6"	10.9"

NOTES:  
 1. PLACE ALL FOOTING REINFORCING IN BOTTOM OF FOOTING WITH 3" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE.  
 2. TOP REINFORCING, WHERE SPECIFIED, SHALL BE PLACED IN THE TOP OF THE FOOTING WITH 2" CLEAR CONCRETE COVER.  
 3. SPOT FOOTINGS SHALL BE CENTERED UNDER COLUMNS AND CONTINUOUS FOOTINGS SHALL BE CENTERED UNDER WALLS, UNLESS NOTED OTHERWISE.  
 4. ALL FOOTINGS SHALL BE FORMED. FOOTINGS SHALL NOT BE EARTH FORMED OR OVERSIZED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.

MARK	WIDTH	LENGTH	THICK	CROSSWISE REINFORCING			LENGTHWISE REINFORCING			REMARKS	
				NO.	SIZE	SPACE	NO.	SIZE	SPACE		
FS3.0	3'-0"	3'-0"	12"	4	#4	2'-6"	10"	4	#4	2'-6"	10"
FS6.5	6'-6"	6'-6"	15"	8	#5	6'-0"	10.3"	8	#5	6'-0"	10.3"
FS12.5	12'-6"	12'-6"	28"	15	#7	12'-0"	10.3"	15	#7	12'-0"	10.3"
FS15.0	15'-0"	15'-0"	32"	17	#8	14'-6"	10.9"	17	#7	14'-6"	10.9"

NOTES:  
 1. PLACE ALL FOOTING REINFORCING IN BOTTOM OF FOOTING WITH 3" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE.  
 2. TOP REINFORCING, WHERE SPECIFIED, SHALL BE PLACED IN THE TOP OF THE FOOTING WITH 2" CLEAR CONCRETE COVER.  
 3. SPOT FOOTINGS SHALL BE CENTERED UNDER COLUMNS AND CONTINUOUS FOOTINGS SHALL BE CENTERED UNDER WALLS, UNLESS NOTED OTHERWISE.  
 4. ALL FOOTINGS SHALL BE FORMED. FOOTINGS SHALL NOT BE EARTH FORMED OR OVERSIZED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.



MARK	'HT'	'A'	'B'	'TW'	'TF'	'V' BARS		'H' BARS		'V2' BARS		'H2' BARS		'T' BARS		'C TOP' BARS		'C BOT' BARS	
						SIZE	SPACE	SIZE	SPACE	SIZE	SPACE	SIZE	SPACE	SIZE	SPACE	SIZE	SPACE	SIZE	SPACE
CRW-1	UP TO 7'-0"	6"	5'-0"	1'-0"	1'-3"	#5	18"	#4	16"	#5	18"	#4	16"	#7	18"	9-#4	6.7"	2-#4	12"

NOTES:  
 1. 'V' BARS SHALL NOT BE SPICED BELOW MID-HEIGHT OF WALL  
 2. FOR WALLS WITH 'HT' OF 9'-0" & GREATER, ONE HALF OF THE 'V' BARS CAN BE DISCONTINUED FROM MID-HEIGHT TO TOP OF WALL.

A3 TYPICAL CONCRETE RETAINING WALL SCHEDULE AND DETAIL  
 S-601 NO SCALE

MARK	WIDTH	LENGTH	THICK	CROSSWISE REINFORCING			LENGTHWISE REINFORCING			REMARKS		
				NO.	SIZE	SPACE	NO.	SIZE	SPACE			
FM-1	9'-0"	43'-0"	33"	44	#6	8'-6"	12"	7	#5	42'-6"	18"	TOP
FM-1	9'-0"	43'-0"	33"	30	#6	8'-6"	18"	8	#6	42'-6"	16"	BOTTOM
FM-2	10'-0"	20'-0"	36"	21	#6	9'-6"	12"	8	#5	19'-6"	18"	TOP
FM-2	10'-0"	20'-0"	36"	11	#6	9'-6"	18"	11	#6	19'-6"	12"	BOTTOM
FM-3	10'-0"	30'-0"	45"	31	#6	9'-6"	12"	8	#5	29'-6"	18"	TOP
FM-3	10'-0"	30'-0"	45"	37	#6	9'-6"	10"	11	#6	29'-6"	12"	BOTTOM
FM-4	4'-6"	48'-0"	15"	54	#4	4'-0"	10.8"	8	#10	47'-6"	7"	TOP
FM-4	4'-6"	48'-0"	15"	60	#4	4'-0"	9.7"	6	#7	47'-6"	9.8"	BOTTOM
FM-5	3'-0"	17'-6"	28"	13	#5	2'-6"	18"	3	#5	17'-0"	18"	TOP
FM-5	3'-0"	17'-6"	28"	13	#6	2'-6"	18"	4	#6	17'-0"	12"	BOTTOM
FM-6	5'-0"	27'-6"	28"	28	#5	4'-6"	12"	4	#5	27'-0"	18"	TOP
FM-6	5'-0"	27'-6"	28"	28	#6	4'-6"	12"	6	#8	27'-0"	12"	BOTTOM

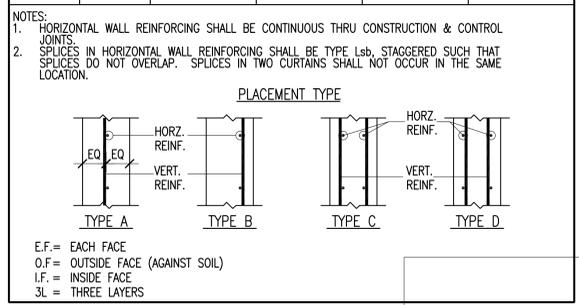
NOTES:  
 1. PLACE ALL FOOTING REINFORCING IN BOTTOM OF FOOTING WITH 3" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE.  
 2. TOP REINFORCING, WHERE SPECIFIED, SHALL BE PLACED IN THE TOP OF THE FOOTING WITH 2" CLEAR CONCRETE COVER.  
 3. SPOT FOOTINGS SHALL BE CENTERED UNDER COLUMNS AND CONTINUOUS FOOTINGS SHALL BE CENTERED UNDER WALLS, UNLESS NOTED OTHERWISE.  
 4. ALL FOOTINGS SHALL BE FORMED. FOOTINGS SHALL NOT BE EARTH FORMED OR OVERSIZED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.

MARK	SIZE	REINFORCING		REMARKS
		VERTICAL	TIES	
CC-1	15'x15"	8-#5	#3 @ 10" O.C.	
CC-2	15'x42"	18-#6	#3 @ 12" O.C.	
CC-3	8'x18"	10-#5	#3 @ 8" O.C.	
CC-4	8'x8"	8-#5	#3 @ 8" O.C.	
CC-5	15'x54"	22-#6	#3 @ 12" O.C.	

NOTES:  
 1. SEE DETAIL C5/S-602 FOR TYPICAL TIE SPACING AND PLACEMENT.  
 2. SEE CONCRETE REINFORCING BAR DEVELOPMENT AND LAP SPICE SCHEDULE.

MARK	THICK	HORIZONTAL REINFORCING	VERTICAL REINFORCING	T & B HORIZ BARS	PLACEMENT
CFW-2	12"	#4 @ 13" O.C. E.F	#4 @ 18" O.C. E.F	2-#5	TYPE C
CFW-3	15"	#4 @ 10" O.C. E.F	#4 @ 17" O.C. E.F	2-#5	TYPE C
CFW-4	20"	#5 @ 12" O.C. E.F	#4 @ 13" O.C. E.F	2-#5	TYPE C
CFW-5	18"	#5 @ 12" O.C. E.F	#4 @ 14" O.C. E.F	2-#5	TYPE C
CFW-6	8"	#5 @ 16" O.C. I.F	#4 @ 16" O.C. I.F	2-#5	TYPE B
CFW-7	30"	#5 @ 8" O.C. E.F	#5 @ 13" O.C. E.F	2-#5	TYPE C
CFW-8	14"	#4 @ 10" O.C. E.F	#4 @ 18" O.C. E.F	2-#5	TYPE C
CFW-9	31.5"	#5 @ 8" O.C. E.F	#5 @ 13" O.C. E.F	2-#5	TYPE C
CW-1	15"	#4 @ 6" O.C. E.F	#5 @ 12" O.C. E.F	2-#5	TYPE C
CW-2	9"	#5 @ 12" O.C. E.F	#5 @ 12" O.C. E.F	2-#5	TYPE C
CW-3	8"	#5 @ 12" O.C.	#5 @ 12" O.C.	2-#5	TYPE A

NOTES:  
 1. HORIZONTAL WALL REINFORCING SHALL BE CONTINUOUS THRU CONSTRUCTION & CONTROL JOINTS.  
 2. SPICES IN HORIZONTAL WALL REINFORCING SHALL BE TYPE Lsb, STAGGERED SUCH THAT SPICES DO NOT OVERLAP. SPICES IN TWO CURTAINS SHALL NOT OCCUR IN THE SAME LOCATION.



CONC WALL/CONC FDTN WALL SCHEDULE  
 S-601 NO SCALE

**FFKR ARCHITECTS**  
 bogue building  
 730 pacific avenue  
 salt lake city  
 Utah 84104  
 • 801-521-6186  
 • 801-539-1916  
 fkr.com

THE ICE SHEET ADDITION  
 4390 HARRISON BLVD. OGDEN, UT 84403  
 CONSTRUCTION DOCUMENTS

REGISTERED STRUCTURAL ENGINEER  
 #170416  
 JEFFERY THOMAS MILLER  
 8/6/12

DATE: 9/4/2012  
 STATUS: CD  
 PROJECT NUMBER: 11124  
 DRAWING FILE: 0827712  
 DRAWN BY: MK  
 CHECKED BY: JTM  
 SCALE: NO SCALE  
**STRUCTURAL SCHEDULES**  
 S-601

**UNFACTORED JOIST LOAD SCHEDULE**

MARK	NONCOMPOSITE		COMPOSITE SUPERIMPOSED	
	DEAD LOAD	CONSTRUCTION LIVE LOAD	DEAD LOAD	LIVE LOAD
JL-1	464	96	104	800
JL-2	421	87	95	363
JL-3	411	85	93	709
JL-4	235	49	53	405
JL-5	348	72	78	600
JL-6	316	66	1340	854
JL-7	316	66	72	273
JL-8	211	44	48	182

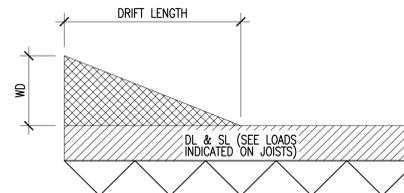
NOTES:  
1. LOADS IN SCHEDULE ARE IN POUNDS PER LINEAR FOOT.  
2. LOAD COMBINATIONS SHALL BE TAKEN FROM THE BUILDING CODE INDICATED IN THE GENERAL STRUCTURAL NOTES.  
3. SEE A4/S-803 FOR ADDITIONAL POINT LOAD AND DISTRIBUTED LOADS.

D2 UNFACTORED JOIST LOAD SCHEDULE (JL-#)  
S-803 NO SCALE

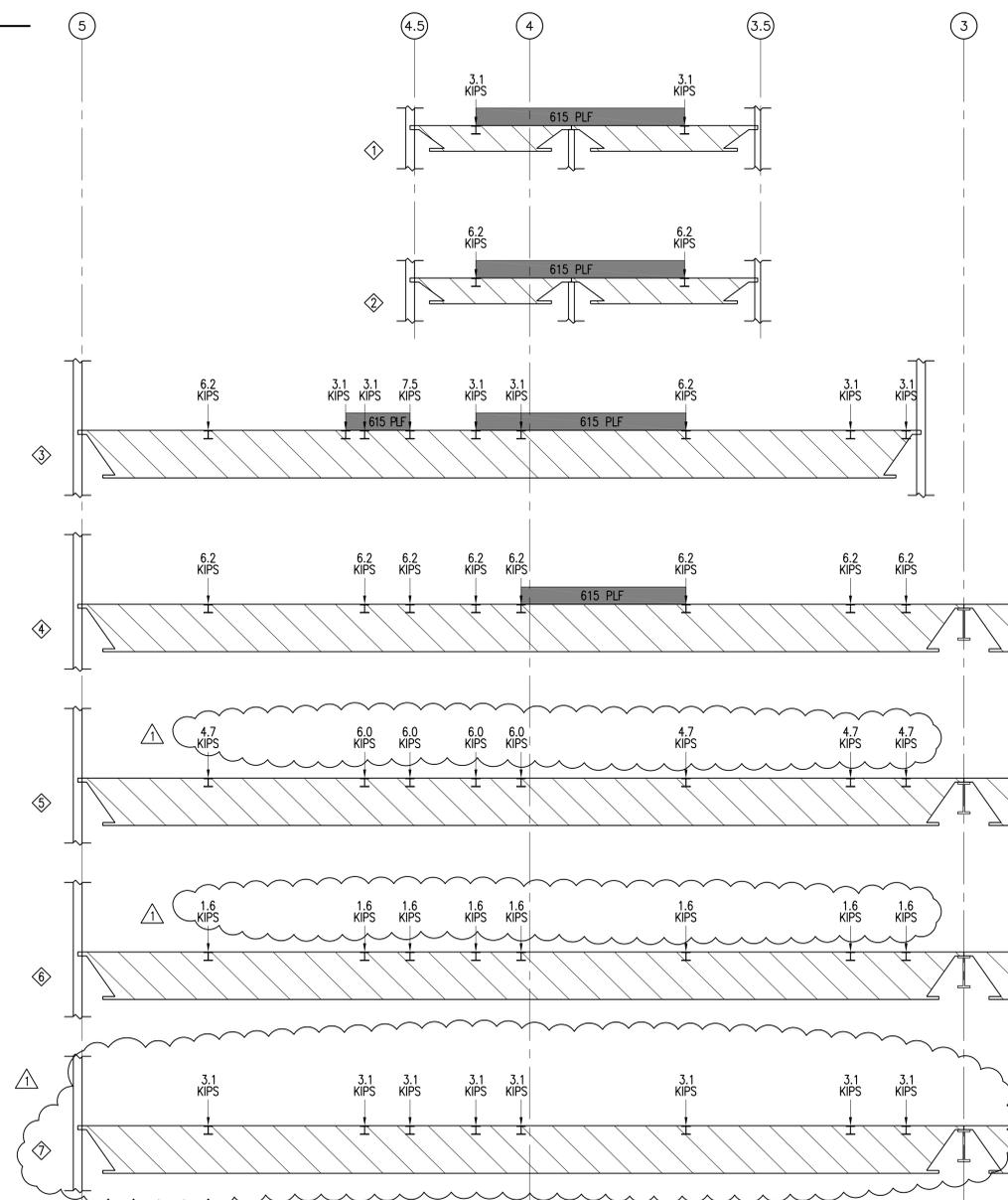
**SNOW DRIFT SCHEDULE**

MARK	DRIFT LENGTH	Wd (PSF)
SD-1	22'-6"	113
SD-2	9'-4"	47

NOTES:  
1. FOR OWSJ DESIGN DRIFT LOADS SHALL BE IN ADDITION TO ALL LOADS INDICATED ON THE PLANS.  
2. UNIFORM LOADS INDICATED ON PLANS ARE IN POUNDS PER LINEAR FOOT.  
3. Wd IN SNOW DRIFT SCHEDULE IS IN POUNDS PER SQUARE FOOT AND SHALL BE MULTIPLIED BY THE JOIST SPACING TO DETERMINE THE JOIST LOAD IN POUNDS PER LINEAR FOOT.



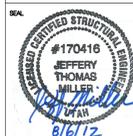
D4 SNOW DRIFT DIAGRAM (SD-#)  
S-803 NO SCALE



NOTES:  
1. ## KIPS INDICATES ADDITIONAL UPLIFT/DOWNWARD FORCE ON STEEL JOISTS.  
2. # PLF INDICATES ADDITIONAL DOWNWARD FORCE PER LINEAR FOOT ON STEEL JOISTS.  
3. LOADS ARE IN ADDITION TO LOADS IN D2/S-803.

A4 JOIST ADDITIONAL LOAD DIAGRAM  
S-803 NO SCALE

THE ICE SHEET ADDITION  
4390 HARRISON BLVD. OGDEN, UT 84403  
CONSTRUCTION DOCUMENTS



DATE	STATUS
9/4/2012	CD
08/27/12	ADDENDUM #1

PROJECT NUMBER	11124
DRAWN BY	MK
CHECKED BY	JTM

SCALE: NO SCALE  
**JOIST LOAD DIAGRAMS**

DCGM STAMP OF APPROVAL