MUSGROVE ENGINEERING, P.A.

David O. Musgrove, P.E. ~ Principal
Charles E. Paulin, P.E. ~ Principal
Bill A. Carter, P.E. ~ Principal
Todd Nelson ~ Principal

March 6, 2014

Attention: **All Plan Holders**

Re: **Renovate Infrastructure**
Capitol Annex Phase 4
Department of Administration
Boise, Idaho
DPW Project No. 14006

Addendum No. 1

NOTICE TO ALL BIDDERS:

You are hereby notified of the following clarifications of and/or revisions to the Drawings and Specifications for the above referenced project. Addendum No. 1 is hereby made a part of the project requirements and contract documents for the reference project. Be sure to acknowledge it in your Bid Proposal Form.

ITEM No. 1 – GENERAL CLARIFICATIONS

1. Bid forms (BP-1, BP-2) had incorrect order of bid alternates. See attached for corrected bid forms.

2. Sheet FPCC-35 of specs – Owner's Project Identification Information: Electrical power will be connected to all HVAC equipment. However HVAC equipment will not be operational.

3. If the construction of phase 4 and bidding of future phase 5 overlap, the phase 4 contractor shall make building available, prior to substantial completion, for future construction phase walk-through. Contractor shall be given one (1) week lead time prior to walk through. Building shall be picked up and clean prior to walk through.

4. A second addendum will be provided on 3/11/14

ITEM No. 2 – PLANS

Sheet P3.1

1. Plumbing Fixture Schedule – The following drinking fountain shall be used in lieu of the scheduled unit: Elkay model LZWS-EDFPBM117K bi-level drinking fountain with bottle filling station; Elkay model ECH8 remote chiller; Elkay model LKAPR1 accessory apron; Elkay model ACCESS12X38-5 access panel.

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Sheet M4.1

1. Ductless Split System Schedule – CU-1 through CU-5 shall be provided with low ambient kits down to 0 degrees Fahrenheit. CU-6 shall be provided with ultra-low ambient kit down to -40 degrees Farhenheit.

Sheet T2.0 Basement Telecom Plan

1. Revise location of conduits through ceiling of CHASE B006 to reflect correct location within future telecommunications room on floor above. See attached sketch.

Sheet T2.1 First Floor Telecom Plan

1. Revise location of conduits through floor and ceiling of future telecom room. See attached sketch.

SHEET A2.1, A2.2, A2.3, and A2.4

1. At note 11 of the Demolition Keyed Notes add the following: 'Coordinate all openings with Mechanical Drawings including any additional cuts that may be required at roof deck locations.'

SHEET A2.4

1. On floor plan, revise note call out at (4) locations on the northeast wing of building at north side to be a number 4 keyed note in lieu of number 17.

SHEET A3.0, A3.1, A3.2, A3.3, and A3.4

1. On floor plans, wall types on exterior walls shall run continuous both above and below existing windows. Height of wall on all exterior walls shall be to the underside of the lower stem of concrete deck structure above.

2. Provide a general note to read the following: 'Contractor shall be responsible to maintain, adjust, and repair existing OSB protective sheathing covering floor and wall surfaces.'

SHEET A3.0

1. At basement level floor plan, provide wall and door details at Elevator B014 and Elevator Equipment B015 per Drawings ADD-1-1, and ADD-1-2, attached to this Addendum. Work shall be part of Alternate No. 1.

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SHEET A3.1

1. At first level floor plan, wall type for west wall of Data 104 shall be A2.

SHEET A3.2

1. At second level floor plan, wall type for south wall of Janitor 206 shall be A2.

SHEET A3.3

1. At third level floor plan, wall opening at north side of Data 301 shall be (2) type A2 walls with gypsum board on outside face only.

SHEET A4.1

1. On room finish schedule, delete rooms 105 and 205 in their entirety.

2. On room finish schedule, at rooms 102, 106, 107, 202, 206, and 207 delete all references to ceiling. Rooms shall be open to structure above.

3. On room finish schedule, at rooms 100, 104, 106, 200, 204, 206, 301, and 400 remove all references to the finish flooring. No flooring or base to be installed.

SHEET A5.0

1. At North elevation on fourth level of east side revise (4) windows from 'S' designation to 'N' designation. Refer to Drawing ADD-1-3, attached to this Addendum.

SHEET A7.3

1. On building section, at rooms 102, 107, 202, and 207 delete ceiling and 'SC' note. Rooms shall be open to structure above

SHEET A8.1

1. At Detail 3/A8.1 add general note that reads 'At restroom locations, refer to detail 14/A8.1 for instruction on ceramic tile installation.'

2. At Detail 12/A8.1 revise note from '1/2" green board' to '1/2" water resistant gypsum backer board.'

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SHEET A8.5

1. At Detail 2/A8.5 revise note from ‘New concrete stair’ to ‘New metal stair.’

SHEET E0.1

1. ADD requirements for Design Build Fire Alarm System.

SHEET E2.0

1. ADD lighting to Room B017.
2. REVISE Sheet Note No. 1.

SHEET E3.3

1. RELOCATE electrical requirements for CU-1 and CU-3 to Fourth Floor Power Plan.
2. REVISE locations CU-2.
3. DELETE electrical requirements for CU-5 and CU-6.
4. REVISE layer for disconnects to indicate new (as indicated in note adjacent disconnects).

SHEET E3.4

1. ADD electrical requirements for CU-1 AND CU-3 for relocated equipment.

SHEET E5.1

1. ADD feeder requirement for Distribution Panelboard C ‘DPC’.

SHEET E5.3

1. REVISE Panel Schedules ‘3A1’ AND ‘4A1’.

ITEM No. 3 – SPECIFICATIONS

SPECIFICATIONS SECTION 010100 – SUMMARY OF WORK

Section 1.4.B.2 – Contractor will be required to maintain security along with weather tight conditions during the window replacement portion of the project.

SPECIFICATIONS SECTION 012300 – ALTERNATES

1. Revise Paragraph 3.1.A.1. to read as follows:

3.1.A.1. Alternate No. 1 shall consist of all Work required to replace the existing elevator as shown on Drawings and as specified in Division 14 Section – Electric Traction Elevators and in ‘Appendix A, Elevator Specifications’ in

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the Design Specifications manual.

SPECIFICATIONS SECTION 055000 – METAL FABRICATIONS

1. Add the following Paragraph 1.2.C.:

1.2.C. Steel stairs as indicated on Drawings.

SPECIFICATIONS SECTION 085113 – ALUMINUM WINDOWS

1. Revise Paragraph 3.1 to be as follows:

3.1 EXISTINGWINDOW DEMOLITION AND OPENING EXAMINATION

A. Remove existing windows complete at window openings indicated to receive new aluminum windows.

1. Existing window glazing putty and perimeter sealant are anticipated to contain asbestos.

2. Existing windows removed may be disposed of as general demolition debris.

3. Contractor shall provide any and all required personnel protection during window demolition.

4. Any and all existing perimeter sealant remaining after existing window removal will be abated by others under separate contract at no cost to Contractor. Contractor shall cooperate with such abatement contractor.

B. Contractor shall provide temporary weather tight security closures of existing window openings during period between existing window removal and new window installation.

1. Refer to Drawing ADD-1-4, attached to this Addendum, for minimum temporary window opening closure detail.

C. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions.

SPECIFICATION SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

1. ADD requirements for Design Build Fire Alarm System.

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PRIOR APPROVALS

Elevator

The following approvals are for manufacturers of products only unless specified products or systems are indicated. Contractor is responsible for providing product and/or materials that are equivalent in size, performance, quality, and appearance to those specified. Contractor is responsible for all conditions and/or field adaptations required for approved products other than those specified.

Specifications

Section No.	Item	Manufacturer (Product or System)
Appendix A	Elevator	TKE Synergy 300 Gearless Machine

End of Addendum No. 1

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BID PROPOSAL

TO: STATE OF IDAHO
DIVISION OF PUBLIC WORKS

Gentlemen:

The Bidder, in compliance with your Invitation for Bids for the construction of DPW Project No. 14006, Renovate Infrastructure, Capitol Annex Building – Phase 4, Department of Administration, Boise, Idaho, having examined the bidding and Contract Documents and the site of the proposed Work, and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies and to provide the service and insurance in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the Work required under the Contract Documents.

Bidder hereby agrees to commence Work under this Contract on a date to be specified in the written "Notice to Proceed" of the Owner and to substantially complete the Project within 180 consecutive calendar days thereafter, as stipulated in the specifications. Bidder further agrees to pay as liquidated damages, the sum of $100.00 for each consecutive calendar day after the established substantial completion date or adjusted date as established by change order.

Bidder acknowledges receipt of Addenda No. _____.
(List all Addenda)

BASE PROPOSAL: Bidder agrees to perform all of the base proposal Work described in the specifications and shown on the plans for the sum of:
_____ Dollars ($_____)
(Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

Alternate No. 1:

1. Alternate No. 2 shall consist of all Work required to upgrade the existing elevator as shown on Drawings and as specified in Division 14 Section - Electric Traction Elevators.

2. All selective demolition required to such Alternate work shall be included as a part of this Alternate No. 2.

3. All electrical Work required to provide such Alternate Work shall be included as a part of this Alternate No. 2.

4. Work required under this Alternate No. 2 is to be done in designated "historic areas" of the building. Contractor shall conform to notes on Drawings related to work in such historic areas.

Add the sum of _____ Dollars ($_____)

Alternate No. 2: Provide and install two new rooftop air handlers on 5th floor roof to serve floors 1 – 4 in Northeast portion of building.
Add the sum of _____ Dollars ($_____)

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good for a period of forty-five (45) calendar days after the scheduled opening time for receiving bids.

Upon receipt of written Notice of Intent to Award of this bid, Bidder will execute the formal Contract within ten (10) calendar days and deliver a Surety Bond or Bonds as required by paragraph "Performance and Payment Bonds" first page (ITB-1) of the Instructions to Bidders.

The bid security in the amount of five percent (5%) of the bid amount is to become the property of the Owner, in the event the Contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

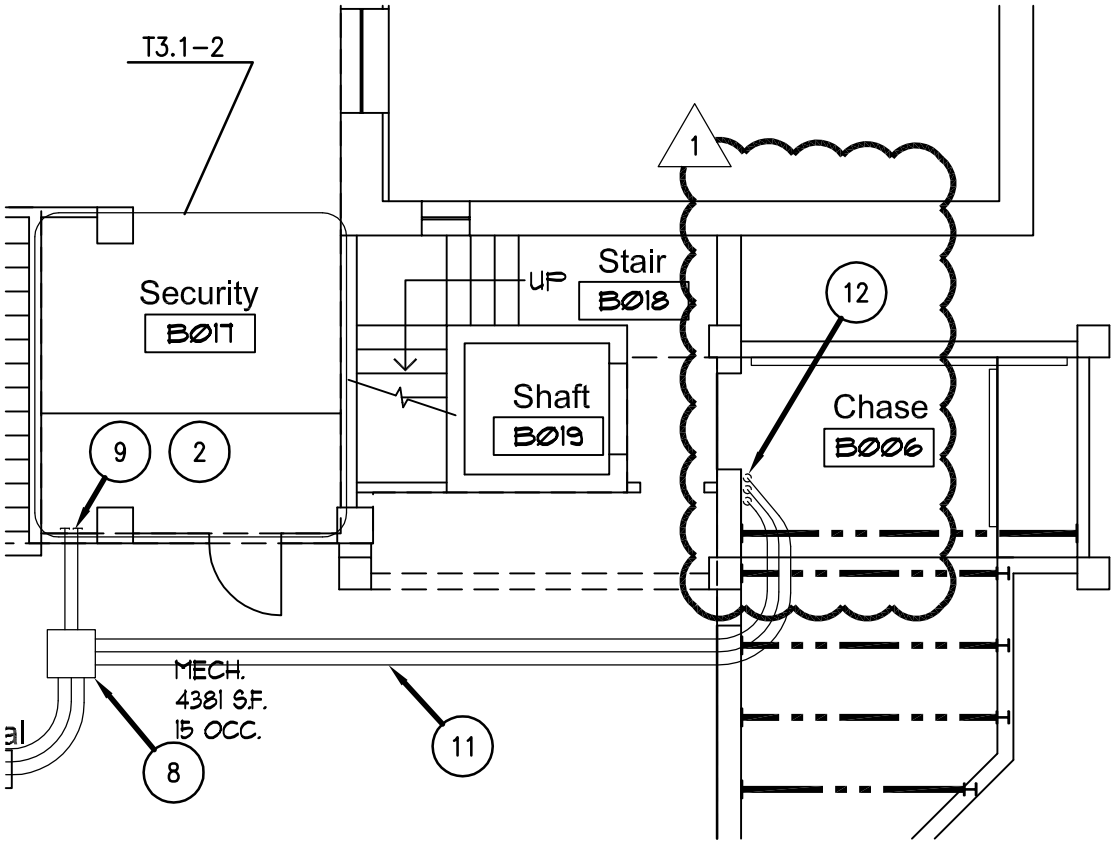
The names and addresses of the entities who will perform the Work identified below, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

Plumbing (PWCL Category 15400)
(Name) _____
(Address) _____
Idaho Public Works Contractors License No. _____
Idaho Plumbing Contractors License No. _____

Heating, Ventilating & Air Conditioning (PWCL Category 15700-HVAC)
(Name)_____
(Address)_____
Idaho Public Works Contractors License No._____
Idaho HVAC Contractors License No. _____

Electrical (PWCL Category 16000)
(Name) _____
(Address) _____
Idaho Public Works Contractors License No. _____
Idaho Electrical Contractors License No. _____

Fire Sprinkler (PWCL Category 13930)
(Name) _____
(Address) _____
Idaho Public Works Contractors License No. _____
Idaho Fire Protection Contractors License No. _____



BASEMENT TELECOM PLAN

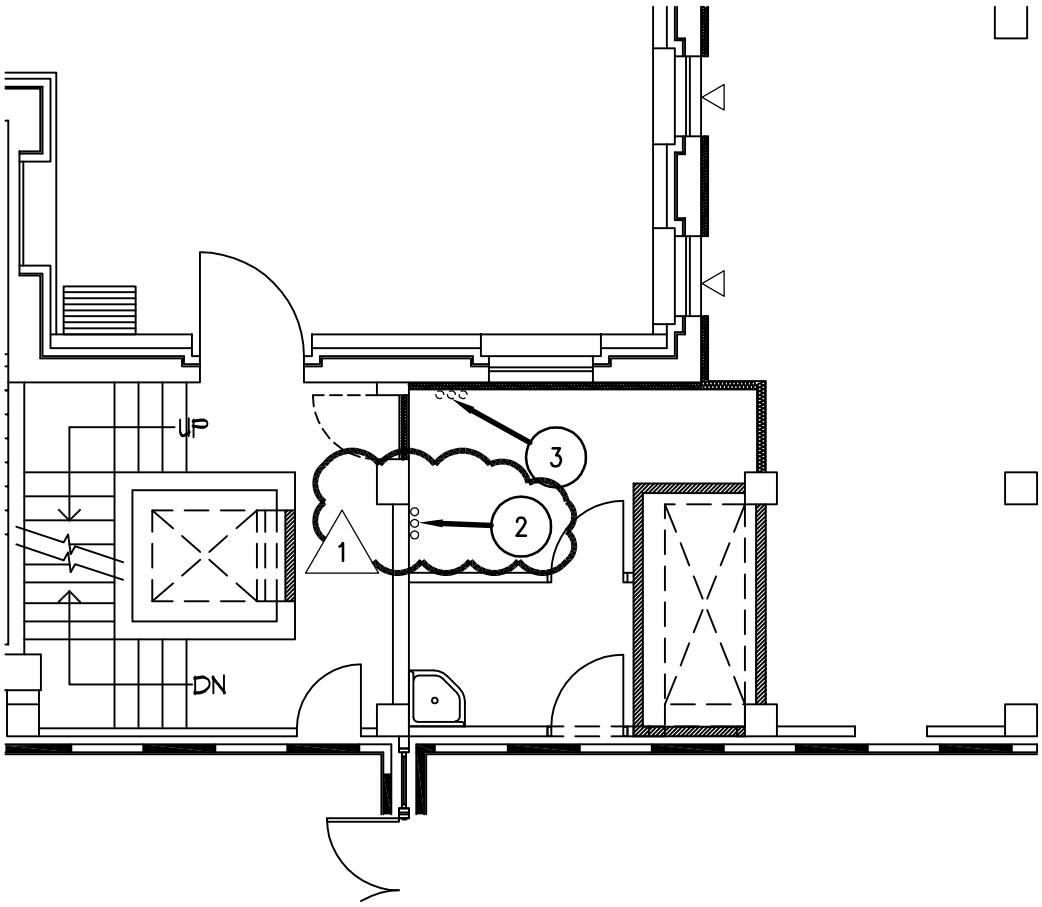
SCALE: 1/8" = 1'-0"

NORTH

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
BICSI
JAY ROMLEIN
3/5/2014
REG. NO. 152782R
EXPIRES 12-31-15
RCDD
SIGNATURE

CSHQA
200 BROAD ST.
BOISE, IDAHO 83702
P: 208-343-4635 F: 208-343-1858
CSHQA PROJECT # 11339 14006

PROJECT NAME	DRAWN	ARCH. PROJECT #	SHEET NO.
14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	JDR		T-1
	CHECKED: JDR	DATE: 3/6/14	ADDENDUM-1
	SCALE: 1/8"=1'-0"	REF. SHEET: T2.0	



FIRST FLOOR TELECOM PLAN

SCALE: 1/8" = 1'-0"

NORTH

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
BICSI
JAY ROMLEIN
3/5/2014
REG. NO. 152782R
EXPIRES 12-31-15
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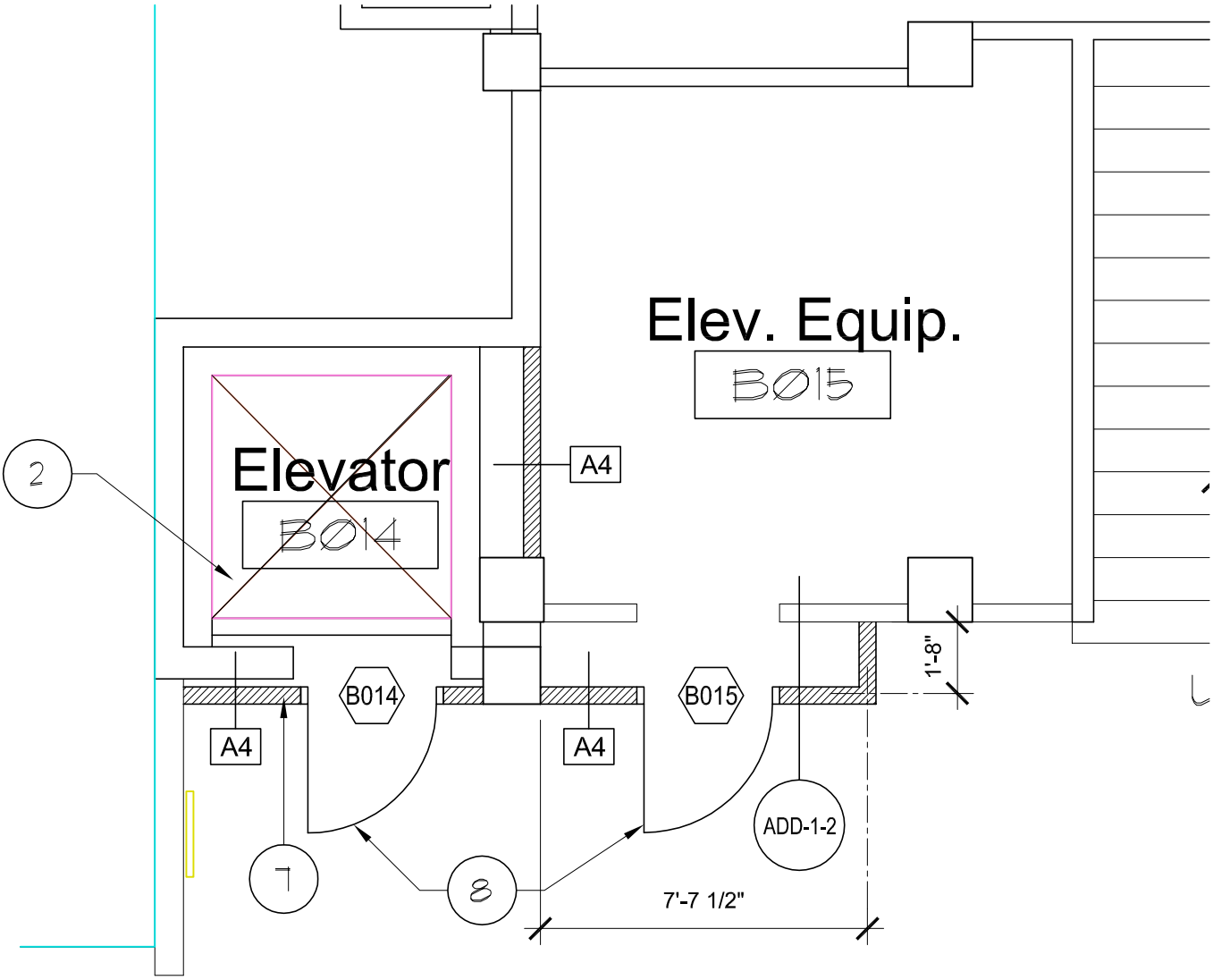
PROJECT NAME	DRAWN	ARCH. PROJECT #	SHEET NO.
14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	JDR		T-2
	CHECKED: JDR	DATE: 3/6/14	ADDENDUM-1
	SCALE: 1/8"=1'-0"	REF. SHEET: T2.0	

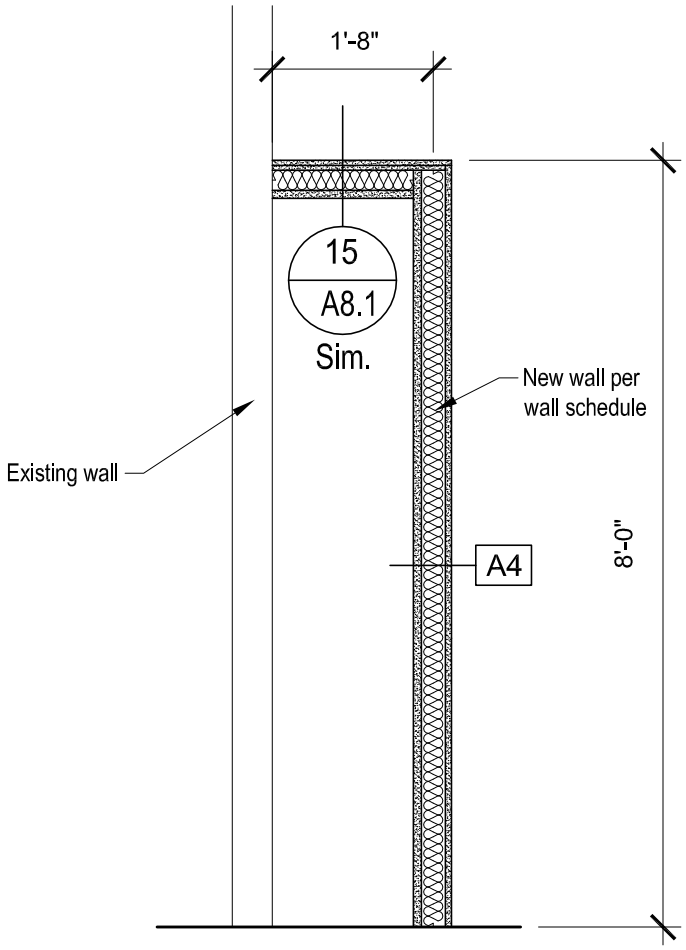


ADD-1-1

Partial Basement Floor Plan

Scale: $\frac{1}{4}$" = 1'-0"

LKV ARCHITECTS LEATHAM KROHN VAN OCKER	PROJECT NAME 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN BT	ARCH. PROJECT # 	SHEET NO. ADD-1-1
		CHECKED KK	DATE 3/6/14	
		SCALE: 1/4" = 1'-0"	REF. SHEET A3.0	



ADD-1-2

Wall Section

Scale: $\frac{1}{2}$" = 1'-0"

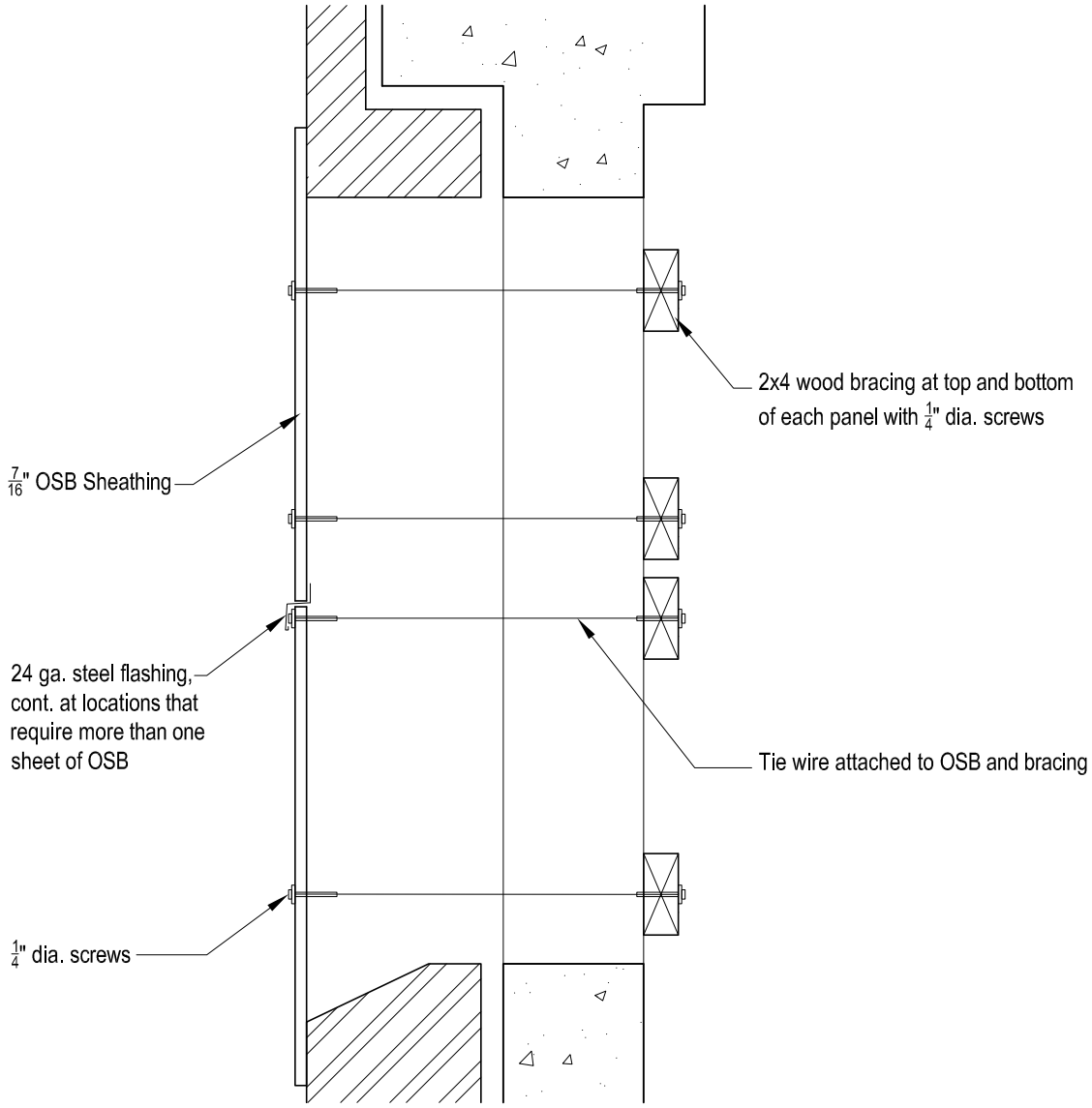
LKV ARCHITECTS LEATHAM KROHN VAN OCKER	PROJECT NAME 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN: BT CHECKED: KK SCALE: 1/2" = 1'-0"	ARCH. PROJECT # DATE: 3/6/14 REF. SHEET: --	SHEET NO. ADD-1-2

ADD-1-3

North Elevation

Scale: $\frac{1}{8}$" = 1'-0"

LKV ARCHITECTS LEATHAM KROHN VAN OCKER	PROJECT NAME 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN: BT CHECKED: KK SCALE: 1/8" = 1'-0"	ARCH. PROJECT # DATE: 3/6/14 REF. SHEET: A5.0	SHEET NO. ADD-1-3



ADD-1-4

Detail

Scale: 1 1/2" = 1'-0"

ARCHITECTS LEATHAM KROHN VAN OCKER	PROJECT NAME 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN BT	ARCH. PROJECT #	SHEET NO. ADD-1-4
		CHECKED KK	DATE 3/6/14	
		SCALE: 1 1/2" = 1'-0"	REF. SHEET --	

FIRE ALARM SYSTEM NOTES:

A. THIS PROJECT SHALL INCLUDE A NEW FIRE ALARM SYSTEM AS REQUIRED FOR CODE COMPLIANCE. SEE SPECIFICATIONS FOR GENERAL REQUIREMENTS.

B. FIRE ALARM SYSTEM SHALL BE DESIGNED AND CONSTRUCTED BY FIRE ALARM SYSTEM CONTRACTOR. SYSTEM SHALL BE DESIGNED AND CONSTRUCTED IN FULL ACCORDANCE WITH LOCAL PREVAILING CODES AND PER THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. FIRE ALARM CONTRACTOR SHALL SUBMIT ALL DOCUMENTATION TO THE PROPER ENTITIES TO OBTAIN ALL PERMITS FOR THE PROJECT FIRE ALARM SYSTEM. FIRE ALARM CONTRACTOR SHALL CONSTRUCT THE FIRE ALARM SYSTEM AND SECURE ALL INSPECTIONS AND APPROVALS FOR THE INSTALLED PROJECT FIRE ALARM SYSTEM. INSTALLATION SHALL BE COMPLETE, OPERATIONAL, AND TESTED IN EVERY DETAIL TO THE FULL ACCEPTANCE OF THE AUTHORITY HAVING JURISDICTION. FINAL INSTALLATION DOCUMENTATION SHALL BE SUBMITTED TO CSHQA AND THE AUTHORITY HAVING JURISDICTION. PROJECT FIRE ALARM SYSTEM SHALL BE GUARANTEED FOR ALL PARTS AND LABOR FOR ONE FULL YEAR STARTING AT THE FINAL ACCEPTANCE BY THE AUTHORITY HAVING JURISDICTION.

C. DEFERRED SUBMITTAL BY CONTRACTOR.

1

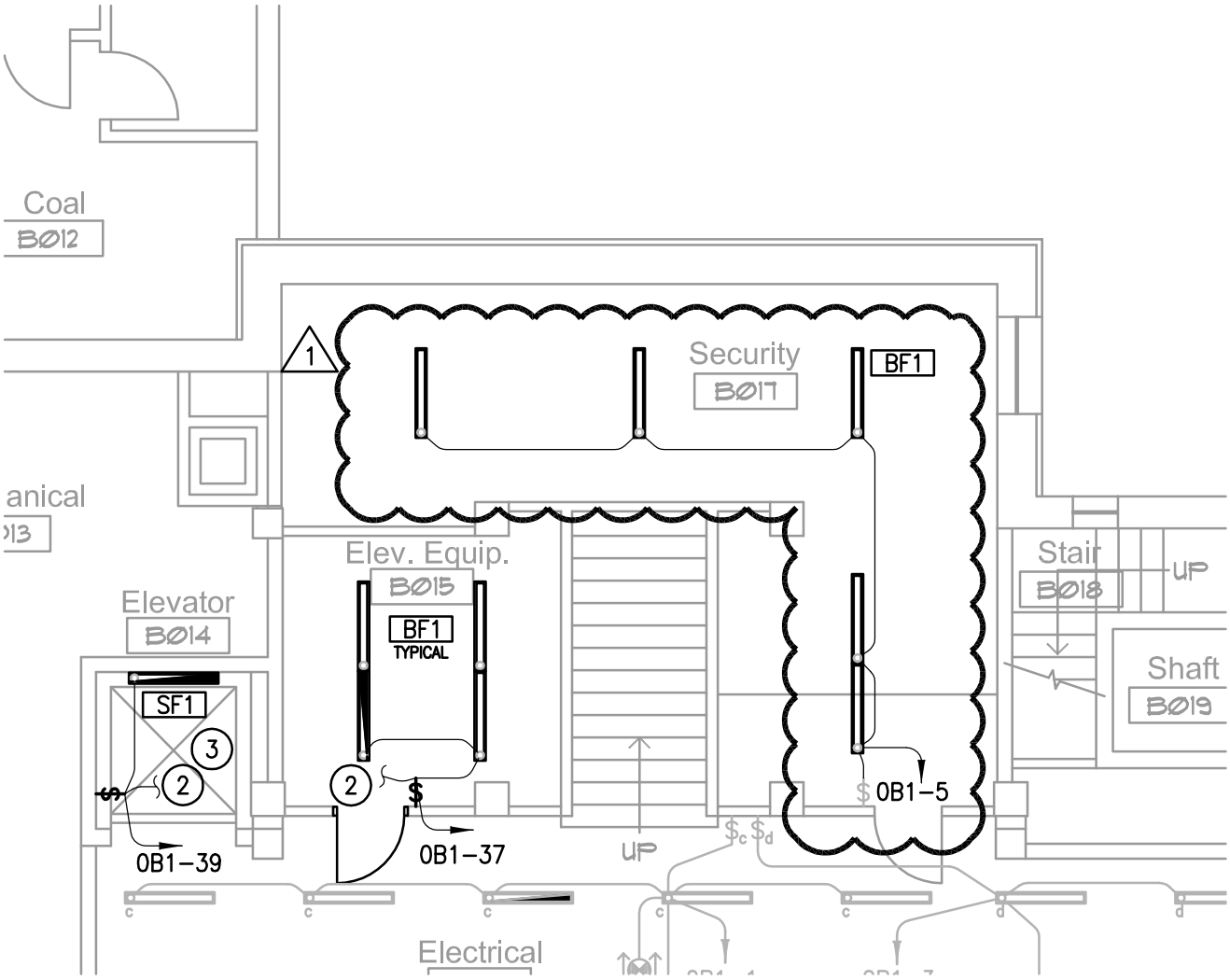
DBS NOTES:

1. INSTALLATION MUST COMPLY WITH 230.95(C) PERFORMANCE TESTING. THE GROUND-FAULT PROTECTION SYSTEM SHALL BE PERFORMANCE TESTED WHEN FIRST INSTALLED ON SITE. THE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH INSTRUCTIONS THAT SHALL BE PROVIDED WITH THE EQUIPMENT. A WRITTEN RECORD OF THIS TEST SHALL BE MADE AND SHALL BE AVAILABLE TO THE AUTHORITY HAVING JURISDICTION.

2. WITH THE INSTALLATION OF A FIRE SPRINKLER SYSTEM, A FIRE ALARM SYSTEM WITH OCCUPANT NOTIFICATION SHALL BE INCLUDED AND IN COMPLIANCE WITH THE INTERNATIONAL FIRE CODE. (IFC 901.4.2, 4603.6, 903.4.1 & 907.6). SCOPE OF WORK FOR THIS PROJECT TO INCLUDE FIRE ALARM CONTROL PANEL FOR MONITORING OF THE SPRINKLER SYSTEM, NOTIFICATION DEVICES IN COMMON AREAS, AND INITIATING DEVICES AS REQUIRED. CAPACITY OF PANEL SHALL INCLUDE CAPACITY FOR FUTURE TENANT BUILD OUT ON ALL FLOORS.

3. COORDINATE AND PROVIDE POWER CONNECTIONS AS REQUIRED. COORDINATE LOCATION OF FACP, REMOTE ANNUNCIATOR AND NAC PANELS WITH ARCHITECT AND AUTHORITY HAVING JURISDICTION. SEE FIRE ALARM SYSTEM NOTES.

	PROJECT NAME: 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN: JCG	ARCH. PROJECT #: 11339	SHEET NO.: E-1
		CHECKED: AKD	DATE: 03/06/2014	ADDENDUM #1
		SCALE: 1" = 3/4"	REF. SHEET: E0.1	



SHEET NOTES:

1. EXISTING EXTERIOR & COMMON AREA LIGHTING CONTROL PANEL 'LCP'. FURNISH AND INSTALL 1" CONDUITS FROM 'LCP' UP INTO ELECTRICAL ROOM FOR CONNECTIONS TO EXTERIOR LIGHTING AND COMMON AREA LIGHTING IN CORRIDORS AND STAIRWAYS.

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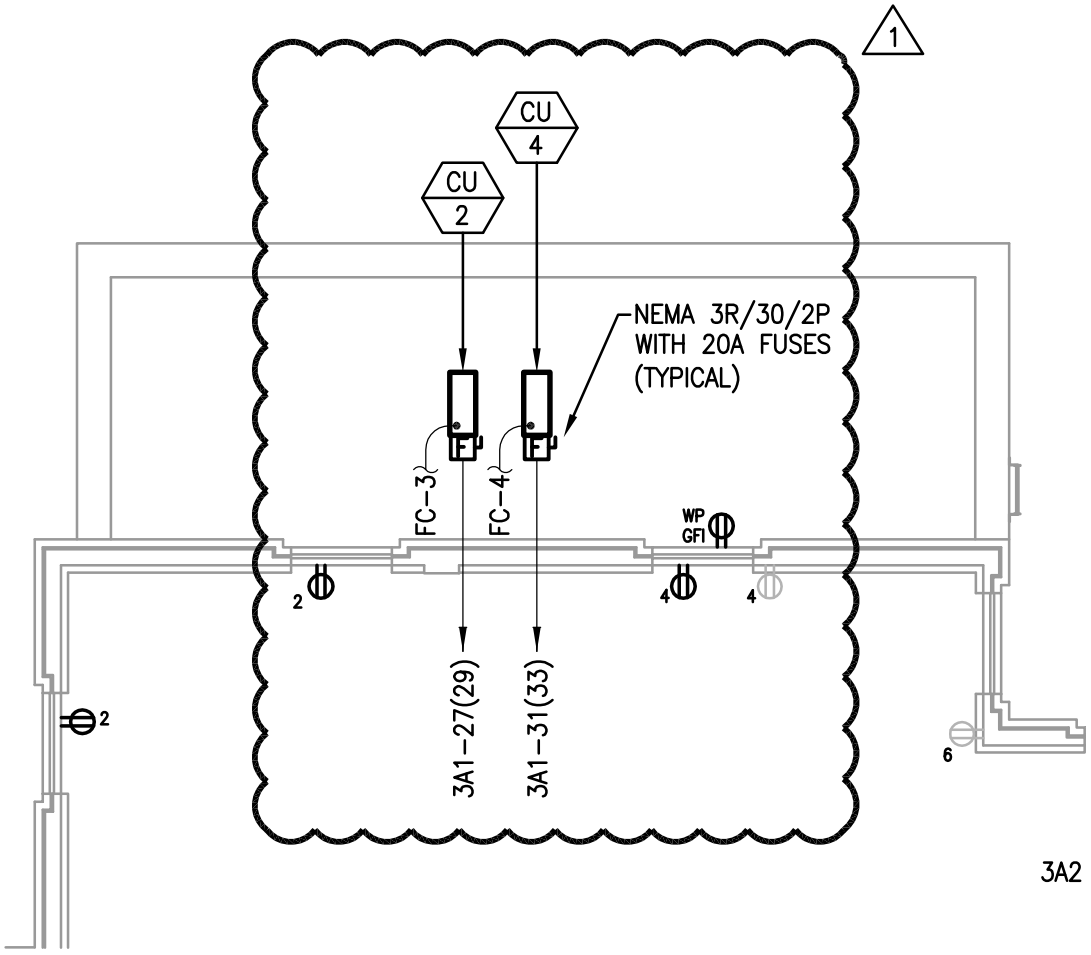
NORTH

BASEMENT LIGHTING PLAN

SCALE: 1/8" = 1'-Ø"

	PROJECT NAME	DRAWN	ARCH. PROJECT #	SHEET NO.
	14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	JCG	11339	E-2
		CHECKED: AKD	DATE: 03/06/2014	ADDENDUM #1
		SCALE: 1" = 1/8"	REF. SHEET: E2.0	



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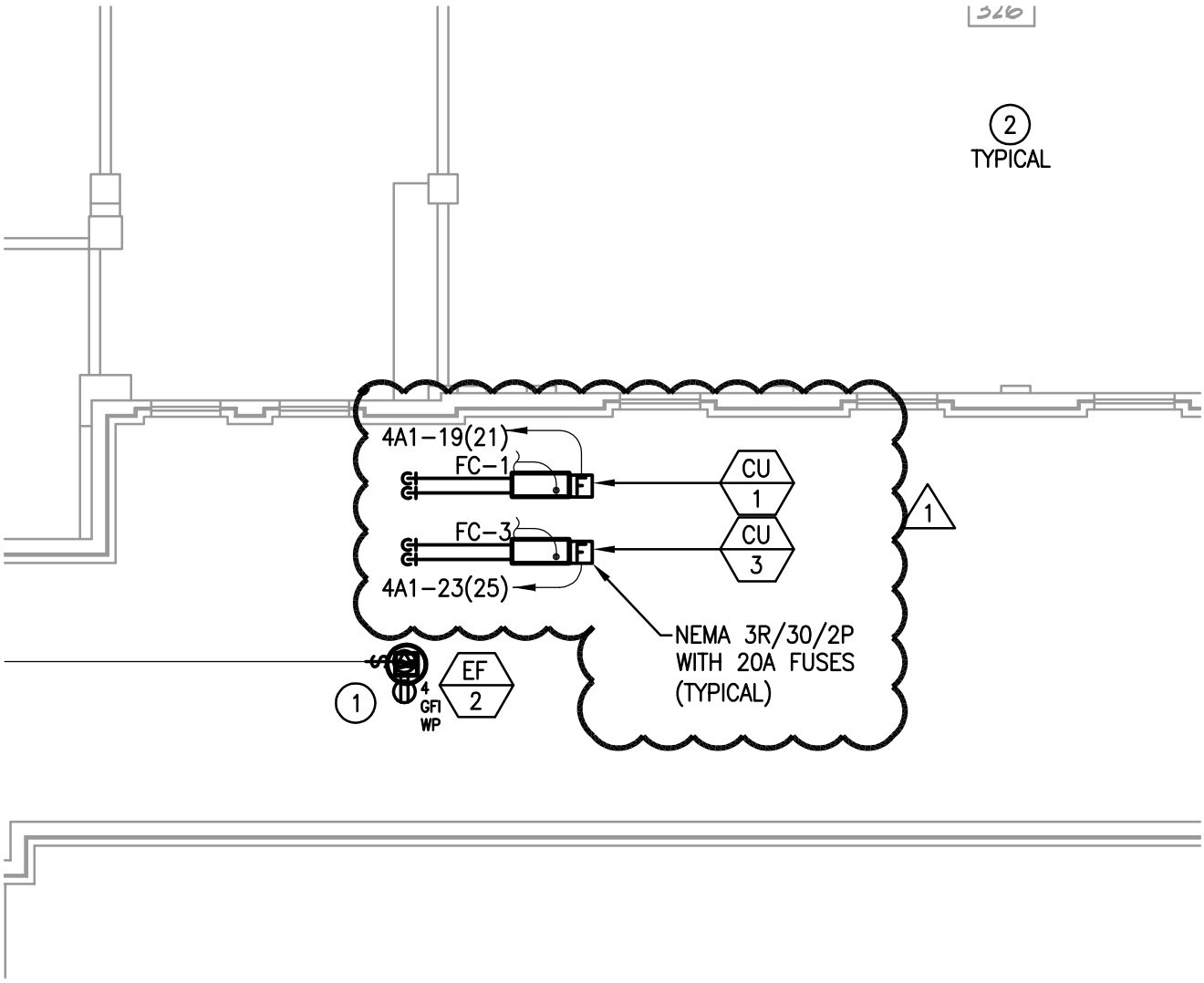
9201
3.6.14
STATE OF IDAHO
AMY K. DOCKTER

NORTH

THIRD FLOOR POWER PLAN

SCALE: 1/8" = 1'-0"

	PROJECT NAME	DRAWN	ARCH. PROJECT #	SHEET NO.
	14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	JCG	11339	E-3
		CHECKED: AKD	DATE: 03/06/2014	ADDENDUM #1
		SCALE: 1" = 1/8"	REF. SHEET: E3.3	



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9201
3.6.14
STATE OF IDAHO
AMY K. DOCKTER

NORTH

FOURTH FLOOR POWER PLAN

SCALE: 1/8" = 1'-0"

	PROJECT NAME 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN JCG	ARCH. PROJECT # 11339	SHEET NO. E-4 ADDENDUM #1
		CHECKED AKD	DATE 03/06/2014	
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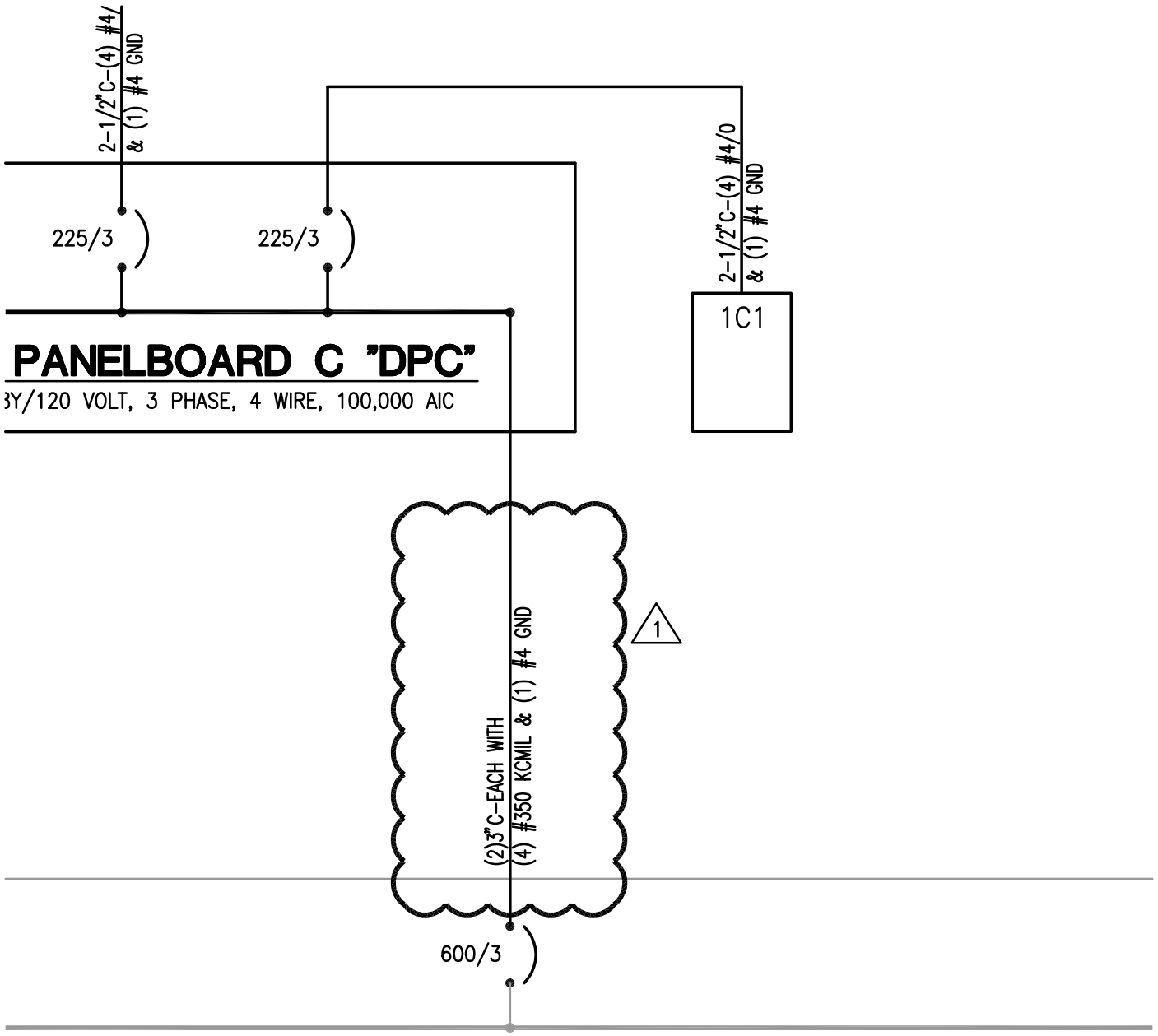

XIMUM BUSSED
EIGHT SECTIONS
ANSION

DISTRIBUTION BOARD LOW VOLTAGE "DBL"

1600 AMP FULLY BUSSED, 208Y/120 VOLT, 3 PHASE, 4 WIRE, 100,000 AIC

PROFESSIONAL ENGINEER REGISTERED 9201 3.6.14 STATE OF IDAHO AMY K. DOCKTER

1 SINGLE LINE DIAGRAM

SCALE NONE

PROJECT NAME: 14006 - RENOVATE INFRASTRUCTURE CAPITAL ANNEX BLDG. PHASE 4	DRAWN: JCG	ARCH. PROJECT #: 11339	SHEET NO.	
	CHECKED: AKD	DATE: 03/06/2014	E-5	
	SCALE: 1" = 1"	REF. SHEET: E5.1	ADDENDUM #1	

PANEL '3A1'
208Y/120-VOLT, 3-PHASE, 4-WIRE
225-AMP, MAIN LUGS ONLY

MOUNTING: SURFACE

NOTES: COMMERCIAL BOLT-ON CIRCUIT BREAKER PANELBOARD.

CKT NO	LOAD DESCRIPTION	REF NO	BRKR TYPE	LOAD AMPS	BREAKER P	BREAKER AMP	PHASE AMPS A	PHASE AMPS B	PHASE AMPS C	BREAKER AMP	BREAKER P	LOAD AMPS	BRKR TYPE	REF NO	LOAD DESCRIPTION	CKT NO
1	LTS-ELEC RM			2.0	1	20	5.0			20	1	3.0			REC-SOUTH PERIMETER	2
3	LTS-RESTROOMS				1	20		3.0		20	1	3.0			REC-SOUTH PERIMETER	4
5	SPARE				1	20			3.0	20	1	3.0			REC-SOUTH PERIMETER	6
7	SPARE				1	20	3.0			20	1	3.0			REC-SOUTH PERIMETER	8
9	SPARE				1	20		4.5		20	1	4.5			REC-SOUTH PERIMETER	10
11	SPARE				1	20			4.5	20	1	4.5			REC-SOUTH PERIMETER	12
13	SPARE				1	20	3.0			20	1	3.0			REC-CHAMBER	14
15	SPARE				1	20		1.5		20	1	1.5			REC-ELEC	16
17	SPARE				1	20			6.5	20	1	6.5			REC-WATER COOLER/RESTROOM	18
19	SPARE				1	20	0.0			20	1				SPARE	20
21	SPARE				1	20		0.0		20	1				SPARE	22
23	SPARE				1	20			0.0	20	1				SPARE	24
25	SPARE				1	20	0.0			20	1				SPARE	26
27	CONDENSING UNIT #2			15.0	2	20		15.0		20	1				SPARE	28
29	**			15.0	*	**			15.0	20	1				SPARE	30
31	CONDENSING UNIT #4			15.0	2	20	15.0			20	1				SPARE	32
33	**			15.0	*	**		15.0		20	1				SPARE	34
35	SPARE				1	20			0.0	20	1				SPARE	36
37	SPARE				1	20	0.0			20	1				SPARE	38
39	SPARE				1	20		0.0		20	1				SPARE	40
41	SPARE				1	20			0.0	20	1				SPARE	42
	PROJECT #11339-4				PANEL TOTALS:		26	39	29						03/06/14	

1

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PROJECT NAME
14006 - RENOVATE
INFRASTRUCTURE
CAPITAL ANNEX BLDG.
PHASE 4

DRAWN: JCG
CHECKED: AKD
SCALE: 1" = 3/4"
ARCH. PROJECT #: 11339
DATE: 03/06/2014
REF. SHEET: E5.3
SHEET NO.: E-6
ADDENDUM #1

PANEL '4A1'
208Y/120-VOLT, 3-PHASE, 4-WIRE
225-AMP, MAIN LUGS ONLY

MOUNTING: SURFACE

NOTES: COMMERCIAL BOLT-ON CIRCUIT BREAKER PANELBOARD.

CKT NO	LOAD DESCRIPTION	REF NO	BRKR TYPE	LOAD AMPS	BREAKER P	BREAKER AMP	PHASE AMPS A	PHASE AMPS B	PHASE AMPS C	BREAKER AMP	BREAKER P	LOAD AMPS	BRKR TYPE	REF NO	LOAD DESCRIPTION	CKT NO
1	LTS-ELEC RM			2.0	1	20	10.8			20	1	8.8			EF-1, EF-2	2
3	SPARE				1	20		3.0		20	1	3.0			ROOFTOP RECEPTACLE	4
5	SPARE				1	20			1.5	20	1	1.5			REC-ELEC	6
7	SPARE				1	20	0.0			20	1				SPARE	8
9	SPARE				1	20		0.0		20	1				SPARE	10
11	SPARE				1	20			0.0	20	1				SPARE	12
13	SPARE				1	20	0.0			20	1				SPARE	14
15	SPARE				1	20		0.0		20	1				SPARE	16
17	SPARE				1	20			0.0	20	1				SPARE	18
19	CONDENSING UNIT #1			15.0	2	20	15.0			20	1				SPARE	20
21	**			15.0	*	**		15.0		20	1				SPARE	22
23	CONDENSING UNIT #3			15.0	2	20			15.0	20	1				SPARE	24
25	**			15.0	*	**	15.0			20	1				SPARE	26
27	SPARE				1	20		0.0		20	1				SPARE	28
29	SPARE				1	20			0.0	20	1				SPARE	30
31	SPARE				1	20	0.0			20	1				SPARE	32
33	SPARE				1	20		0.0		20	1				SPARE	34
35	SPARE				1	20			0.0	20	1				SPARE	36
37	SPARE				1	20	0.0			20	1				SPARE	38
39	SPARE				1	20		0.0		20	1				SPARE	40
41	SPARE				1	20			0.0	20	1				SPARE	42
	PROJECT #11339-4				PANEL TOTALS:		41	18	17						03/06/14	

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PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO AMY K. DOCKTER 9201 3.6.14

PROJECT NAME
14006 - RENOVATE INFRASTRUCTURE
CAPITAL ANNEX BLDG.
PHASE 4

DRAWN: JCG
CHECKED: AKD
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REF. SHEET: E5.3
SHEET NO.: E-7
ADDENDUM #1

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Nonsystem smoke detectors.
5. Heat detectors.
6. Notification appliances.
7. Magnetic door holders.
8. Remote annunciator.
9. Addressable interface device.
10. Digital alarm communicator transmitter.

B. Related Requirements:

1. Section 280513 "Conductors and Cables for Electronic Safety and Security" for cables and conductors for fire-alarm systems.

1.2 ACTION SUBMITTALS

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

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 plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.

    a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    b. Show field wiring required for HVAC unit shutdown on alarm.
    c. Locate detectors according to manufacturer's written recommendations.

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.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

C. Field quality-control reports.

D. Sample warranty.

1.4 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:

a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
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.
d. Riser diagram.
e. Record copy of site-specific software.
f. 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.

g. Manufacturer's required maintenance related to system warranty requirements.
h. 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.

1.5 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 III technician.

C. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

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

E. NFPA Certification: Obtain certification according to NFPA 72 in the form of a placard by an FM Global-approved alarm company.

1.6 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.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/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:

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.
8. Dry system pressure flow switch.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
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. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. Close smoke dampers in air ducts of designated air-conditioning duct systems.
8. Recall elevators to primary or alternate recall floors.
9. Activate elevator power shunt trip.
10. Record events in the system memory.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. High- or low-air-pressure switch of a dry-pipe or pre-action sprinkler system.
3. Elevator shunt-trip supervision.
4. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

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, or remote annunciator.
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.

E. System Supervisory Signal Actions:

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

2.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to locally adopted code. .

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.4 FIRE-ALARM CONTROL UNIT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Faraday.
2. GAMEWELL.
3. Notifier.
4. Siemens Industry, Inc.; Fire Safety Division.
5. Silent Knight.
6. SimplexGrinnell LP.
7. Edwards fire alarm systems.

B. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
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,80characters, 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 B
2. Pathway Survivability: Level 1.

E. Notification-Appliance Circuit:

1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
2. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

F. Elevator Recall:

1. Elevator recall shall be initiated only by one of the following alarm-initiating devices:

   a. Elevator lobby detectors except the lobby detector on the designated floor.
   b. Smoke detector in elevator machine room.
   c. Smoke detectors in elevator hoistway.

2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.
3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.

   a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

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. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.

I. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

J. 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 and digital alarm communicator transmitters 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.

K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

2.5 MANUAL FIRE-ALARM BOXES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Wheelock.
2. Faraday.
3. Fire-Lite Alarms.
4. GAMEWELL.
5. Notifier.

6. Siemens Industry, Inc.; Fire Safety Division.
7. Silent Knight.
8. SimplexGrinnell LP.
9. System Sensor.
10. Edwards fire alarm systems.

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.

1. Single-action mechanism, pull-lever 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.

2.6 SYSTEM SMOKE DETECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Faraday.
2. GAMEWELL.
3. Gentex Corporation.
4. Notifier.
5. Siemens Industry, Inc.; Fire Safety Division.
6. Silent Knight.
7. SimplexGrinnell LP.
8. System Sensor.
9. Edwards fire alarm systems.

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.
7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition.

    a. Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.

b. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F.
c. Multiple levels of detection sensitivity for each sensor.
d. Sensitivity levels based on time of day.

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. Ionization Smoke Detector:

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.).

E. 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. Each sensor shall have multiple levels of detection sensitivity.

5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.7 NONSYSTEM SMOKE DETECTORS

A. General Requirements for Nonsystem Smoke Detectors:

1. Nonsystem smoke detectors shall be listed as compatible with the fire-alarm equipment installed or shall have a contact closure interface listed for the connected load.
2. Nonsystem smoke detectors shall meet the monitoring for integrity requirements in NFPA 72.

2.8 HEAT DETECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Faraday.
2. GAMEWELL.
3. Gentex Corporation.
4. Notifier.
5. Siemens Industry, Inc.; Fire Safety Division.
6. Silent Knight.
7. SimplexGrinnell LP.
8. System Sensor.
9. Edwards fire alarm systems.

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 or a rate of rise.

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.

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.

2.9 NOTIFICATION APPLIANCES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Wheelock.
2. Gentex Corporation.
3. Siemens Industry, Inc.; Fire Safety Division.
4. SimplexGrinnell LP.
5. System Sensor.
6. Silent Knight.
7. Edwards fire alarm systems.

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: Vibrating type.

D. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464.

E. 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- high letters on the lens.

1. Mounting: Wall mounted unless otherwise indicated.
2. Flashing shall be in a temporal pattern, synchronized with other units.
3. Strobe Leads: Factory connected to screw terminals.
4. Mounting Faceplate: Factory finished, white.

2.10 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 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.

2.11 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.

2.12 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.

D. Control Module:

1. Operate notification devices.
2. Operate solenoids for use in sprinkler service.

2.13 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.
2. Programming device.
3. LED display.
4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.
2. Address of the supervisory signal.
3. Address of the trouble-initiating device.
4. Loss of ac supply.
5. Loss of power.
6. Low battery.
7. Abnormal test signal.
8. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger.

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.1 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."

B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."

C. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway where required.
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 and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.

D. Smoke- or Heat-Detector Spacing: Comply with NFPA 72.

E. 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 long shall be supported at both ends.

F. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.

G. 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.

H. Audible Alarm-Indicating Devices: Install not less than 6 inches 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.

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

J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.2 PATHWAYS

A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.

1. Exposed pathways located less than 96 inches above the floor shall be installed in EMT.

B. Pathways shall be installed in EMT.

C. Exposed EMT shall be painted red enamel.

3.3 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 from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Smoke dampers in air ducts of designated HVAC duct systems.
2. Magnetically held-open doors.

3. Electronically locked doors and access gates.
4. Alarm-initiating connection to elevator recall system and components.
5. Supervisory connections at valve supervisory switches.
6. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
7. Supervisory connections at elevator shunt-trip breaker.

3.4 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.

3.5 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.

3.6 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction.

B. Perform the following tests and inspections

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 NFPA 72 in its "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter.
    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.

C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

G. 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.

3.7 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.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111