



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lt. Governor

Department of Administrative Services

KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management

BRUCE WHITTINGTON
Interim Director

Addendum No. 4

Date: May 15, 2015

To: Contractors

From: Rick James – Project Manager, DFCM

Reference: Unified State Laboratory – Module 2
Department of Public Safety
Department of Health
Department of Agriculture and Food
DFCM Project No. 13020300

Subject: **Addendum No. 4**

Pages	Addendum Cover Sheet	1 page
	Architect's Addendum No. 2	53 pages
	Total	54 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.*

4.1 SCHEDULE: There are no project schedule changes.

4.2 GENERAL ITEMS: See Architect's Addendum No. 2 dated May 15, 2015.



Addendum #2

PROJECT NAME: Unified State Laboratory Module 2

DATE: May 15, 2015

CRSA Project #: 13-024
DFCM Project #: 13020300

FROM: CRSA
649 E. South Temple
Salt Lake City, Utah 84103

(801) 355-5915
Fax (801) 355-9885

TO: All Bidders

The original specifications and drawings, labeled "Bid Set", dated April 21, 2014 for the project referenced above are amended by the following content and form a part of the Contract Documents.

Receipt of this addendum shall be acknowledged by inserting its number and date in the space provided on the bid form.

Attachments:

- Revised sheets: S102A, S102B, S104A, S104C, S602, S607, S702, AE101B.5, AE101C, AE205, AE303, AE304, AE402, AE506, AE508, AE512, AE540, AE604, AE605, AE610, MH101B, ME606, ME609, ME611, ME612, PE103A, PW101C, PW102A, PW102B, PW103A,
- Mechanical Narrative (3) pages on 8-1/2x11.

Changes to Prior Addenda:

1. None.

Changes to Procurement Requirements:

1. A walkthrough to inspect electrical panels and the existing central plant at Module 1 will take place on May 20, 2015 at 10am. Participation is NOT mandatory but it is an opportunity for further field verification. Attendees must provide official ID for entry.

Changes to Contracting Requirements:

1. None.

Changes to Specifications Div 02-14:

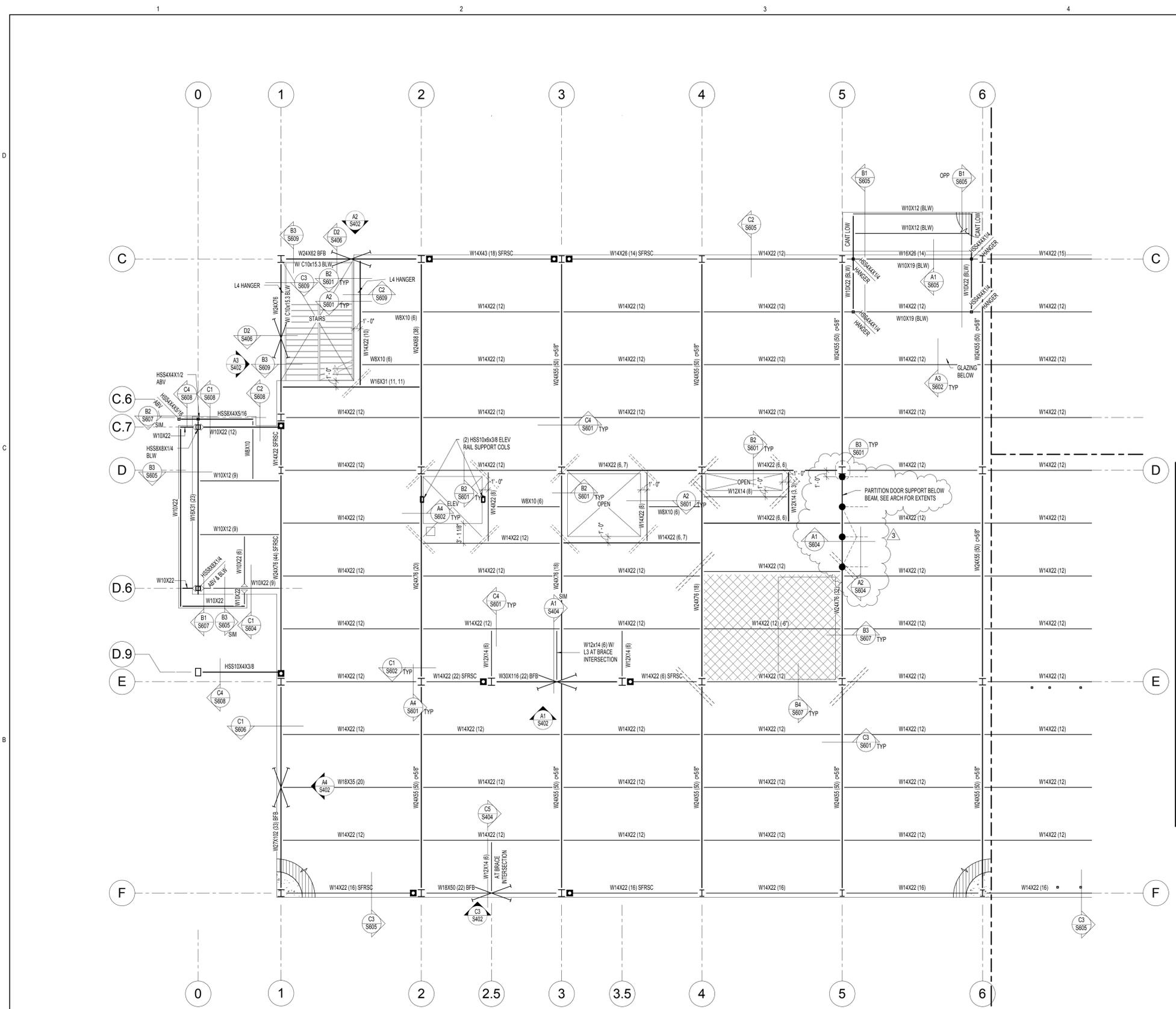
1. Section 033000 Part 2 Products: Approved Manufacturer: Viper, Vaporcheck II 15 mil "Class A" Vapor Barrier.
2. Section 072100 Part 2 Products: Approved Manufacturer:
 - a. Johns Manville, Corbond III Closed cell Spray Polyurethane Foam
 - b. Johns Manville, Fireshell TC Intumescent coating
 - c. SWD Urethane, Quik Shield 112
3. Section 074213.23 Part 2 Products: Approved Manufacturer:
 - a. Noorda BEC, NRS 2000 Rout & Return Rainscreen Panel System.
 - b. Fairview Architectural, Vitrabond Metal Composite Panels
4. Section 107113.43 Part 2 Products: Approved Manufacturer: Industrial Louvers, XD Series SunShades

Changes to Architectural Drawings:

1. AE101B.D: Enlarged Sally Port.

2. AE101C: Added misc items.
3. AE205: Missing sheet issued.
4. AE303: Updated wall sections.
5. AE304: Updated wall sections.
6. AE402: Revised elevations.
7. AE506: Revised detail.
8. AE508: Revised details.
9. AE512: Added detail.
10. AE540: Added details.
11. AE604: Added call outs.
12. AE605: Added call outs.
13. AE610: Revised schedules.
14. See attached Structural, Mechanical & Plumbing drawings.

End of Addendum 1



ROOF FRAMING PLAN NOTES:

- VERIFY ROOF SLOPES, DRAINS, AND DECK BEARING ELEVATIONS WITH ARCHITECTURAL DRAWINGS. SEE ROOF FRAMING DETAILS ON SHEET (S701).
- ALL ROOF OPENINGS SHALL BE FRAMED AS INDICATED IN ROOF FRAMING DETAILS ON SHEET (S701).
- SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR CONCENTRATED LOADS LOCATED FURTHER THAN 6" FROM JOIST/GIRDER PANEL JOINT.
- SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR MECHANICAL UNITS HUNG BELOW JOISTS.
- VERIFY SIZE, WEIGHT, AND LOCATION OF ALL ROOF TOP MECHANICAL UNITS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR STEEL FRAMES AT ALL ROOF TOP EQUIPMENT. COORDINATE OPENINGS WITH MECHANICAL, ELECTRICAL, AND GENERAL CONTRACTORS.
- OPEN WEB STEEL JOISTS AND JOIST GIRDERS SHALL BE DESIGNATED BY THE MANUFACTURER TO SUPPORT THE MECHANICAL AND LATERAL LOADS SHOWN ON THE ROOF FRAMING PLANS IN ADDITION TO THE UNIFORM AND POINT LOADS SHOWN.
- WHERE SKYLIGHTS OR MECHANICAL UNITS INTERRUPT HORIZONTAL BRIDGING, REMOVE CROSS BRIDGING AT JOIST SPACES ON EA SIDE. TYPICAL.
- WHERE DIAGONAL BRIDGING CONFLICTS WITH MECHANICAL DUCTS, REMOVE DIAGONAL BRIDGING AND REPLACE WITH HORIZONTAL BRIDGING (AFTER ROOF DECK IS IN PLACE).
- INDICATES THAT THESE JOISTS SHALL BE DESIGNED FOR AN A/D LOAD OF 1009# AT ANY TOP CHORD PANEL POINT. THIS LOAD TO BE ADDED TO THE GIRDER TOP CHORD LOAD. MULTIPLE "X" ARE ADDITIVE.
- JOIST DESIGNER SHALL DESIGN JOISTS AND SUPPLY ADDITIONAL BRIDGING AS REQUIRED FOR 8 PSF NET UPLIFT DUE TO WIND. THERE IS NO UPLIFT ON GIRDERS.
- SEE SHEETS (S401) THRU (S407) FOR MOMENT FRAME ELEVATIONS AND DETAILS.
- SEE ARCHITECTURAL PLANS FOR ALL STEEL COLUMN LOCATIONS (DIMENSIONS).
- SPRINKLER DESIGNER SHALL COORDINATE THE SPRINKLER DESIGN WITH THE JOIST/GIRDER SHOP DRAWINGS.



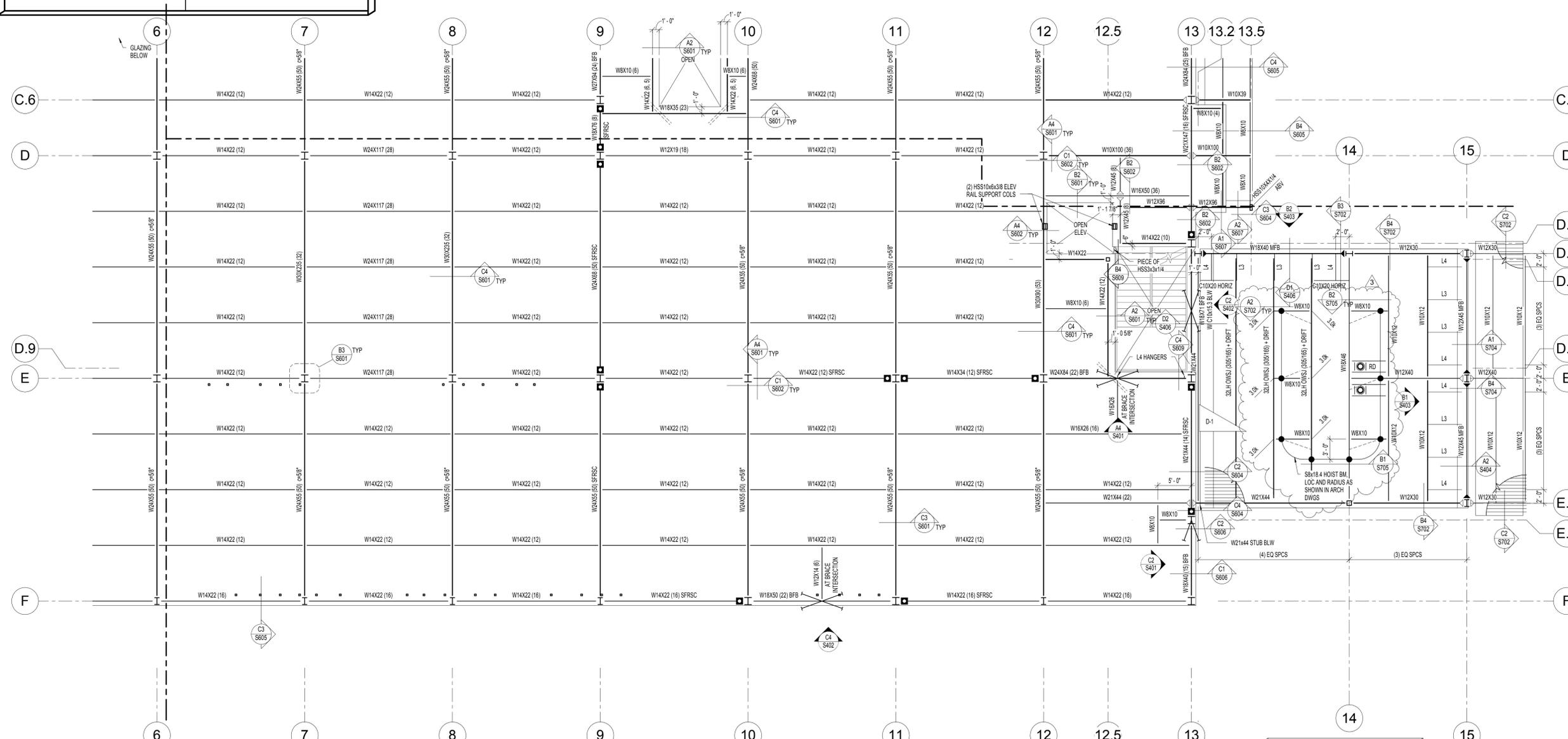
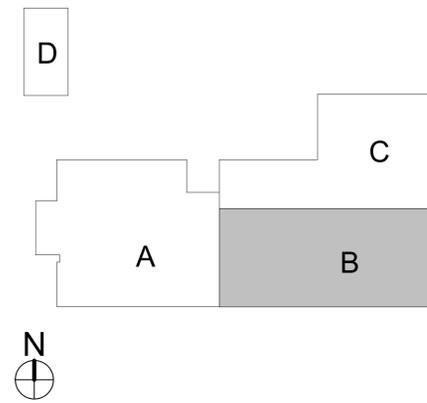
FLOOR FRAMING PLAN NOTES:

- VERIFY WALL FLOOR OPENINGS FOR MECHANICAL SHAFTS, STAIRS, ETC. WITH ARCHITECTURAL DRAWINGS.
- SEE FLOOR FRAMING DETAILS ON SHEET (S601) FOR FRAMING AROUND MISCELLANEOUS OPENINGS.
- SEE SHEETS (S401) AND (S402) FOR FRAME ELEVATIONS AND DETAILS.
- SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS TO STEEL COLUMNS AND SLAB EDGES.
- SEE FOOTING AND FOUNDATION DETAILS ON SHEET (S501) FOR REINFORCING AROUND MISCELLANEOUS OPENINGS IN CONCRETE WALLS.

MARKS & SYMBOLS LEGEND

	SECTION MARK SHEET NUMBER		CONC COL. SEE SCHED ON (S301)		CONC LINTEL SEE SCHED ON (S301)
	FRAME EL MARK FRAME EL ON (S400'S)		LATERAL FRAME MOMENT CONNECTIONS		COMPOSITE STL BMS, SEE GSN ON (S002)
	CONC OVER MTL DECK, SEE GSN ON (S002)		GRAVITY MOMENT CONNECTIONS		NUMBER OF HSA FOR SECTION OF COMPOSITE STL BM, SEE GSN ON (S002)
	ADDITIONAL CONC REINF OF (2) #6 BARS x 6'-0", CTR ON CORNERS, NO SPLICES		DBL SHEAR CONNECTION, SEE SCHED ON (S303)		REOD PRE CAMBER AT MID-SPAN OF BMS, CAMBER TOLERANCE SHALL BE +1/4", -0"
	DEPRESSED SLAB, SEE ARCH PLANS FOR EXACT LOCATION AND EL		STL COL, SEE SCHED ON (S304)		ROOF JST TOP CHORD SHALL BE DESIGNED FOR AN ADDITIONAL LOAD OF .5 KIPS IN TENSION AND COMPRESSION. LOADS ARE PROVIDED AT ULTIMATE STRENGTH LEVEL.
	CONC WALL, SEE SCHED ON (S301)		CONC BM, SEE SCHED ON (S301)		SEISMIC FORCE RESISTING SYSTEM COLLECTOR. SEE DETS ON SHEET (S405) FOR CONNECTIONS
	STL COL, SEE SCHED ON (S304)		MAS LINTEL, SEE SCHED ON (S301)		MTL ROOF DECK, SEE GSN ON (S101)
	OPEN WEB STEEL JOIST (TOTAL LOAD/LIVE LOAD) IN psf		BRG WALL BLW		JST TOP CHORD TIE, SEE ROOF FRAMING DETS ON (S701)
	SFRSC CONNECTION, SEE (S400) SHEETS FOR DETAILS		HORIZ BRIDG		X-BRIDG
			L3 L3x3 1/4 BRACE, SEE (S400) SHEETS FOR ADDITIONAL INFORMATION		L4 L4x4x3/8 FRAME BRACING, SEE DETAILS ON (S404) AND (S406)
			L5 L5x5x3/8 FRAME BRACING, SEE DETAILS ON SHEETS (S404) AND (S406)		

KEY PLAN



APRIL 21, 2014
 BID SET

NOTE:
 THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED APRIL 10, 2014.
 DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE BUILDING IN GENERAL, I.e. GRID TO GRID DIMENSIONS OR DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL PLANS AND DETAILS FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.



DUNN ASSOCIATES, INC
 Consulting Structural Engineers

WWW.DUNN-SE.COM
 PH: 801-575-8877 FAX: 801-575-8875

CRSA
 649 E. South Temple
 Salt Lake City, UT 84102
 801.355.5915

MWL
 11798 N. Lakeridge Pkwy.
 Ashland, VA 23005
 804-228-7473

State of Utah
 Department of Administrative Services

Division of Facilities
 Construction & Management
 4110 State Office Building
 Salt Lake City, Utah 84114
 Phone: (801) 538 - 3018
 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

**Unified State Laboratory
 Module 2**
 4451 South 2700 West,
 Taylorsville, UT 84118

DFCM #: 13020300

Project #: 13062

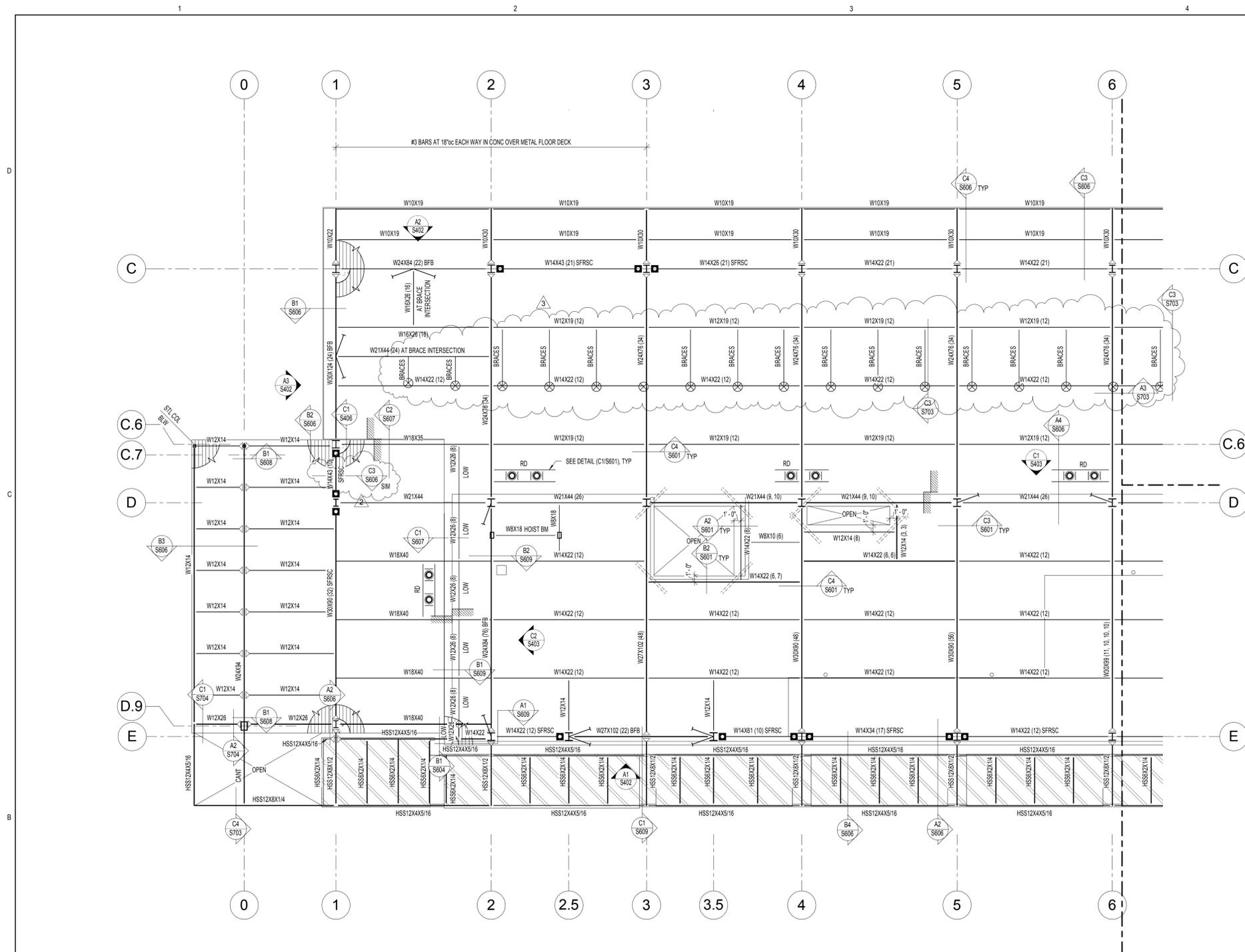
DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 08, 2014	ADD #1
MAY 15, 2014	ADD #2

CHECKED BY: TAK
 DRAWN BY: SJS

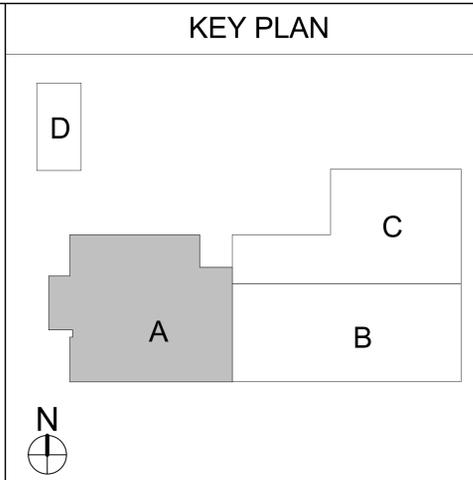
LEVEL 2 FLOOR FRAMING PLAN - AREA B

S102B
 VOLUME 1

A1 LEVEL 2 FLOOR FRAMING - AREA B
 S102B SCALE: 1/8" = 1'-0"



B1 PENTHOUSE FLOOR/ ROOF FRAMING PLAN - AREA A
 S104A SCALE: 1/8" = 1'-0"



- ROOF FRAMING PLAN NOTES:**
1. VERIFY ROOF SLOPES, DRAINS, AND DECK BEARING ELEVATIONS WITH ARCHITECTURAL DRAWINGS. SEE ROOF FRAMING DETAILS ON SHEET (S701).
 2. ALL JOISTS SHALL HAVE 5' DEEP BEARING ENDS. UNO.
 3. ALL GIRDERS SHALL HAVE 7 1/2' DEEP BEARING ENDS. UNO.
 4. ALL ROOF OPENINGS SHALL BE FRAMED AS INDICATED IN ROOF FRAMING DETAILS ON SHEET (S701).
 5. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR CONCENTRATED LOADS LOCATED FURTHER THAN 6" FROM JOIST/GIRDER PANEL JOINT.
 6. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR MECHANICAL UNITS HUNG BELOW JOISTS.
 7. VERIFY SIZE, WEIGHT, AND LOCATION OF ALL ROOF TOP MECHANICAL UNITS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR STEEL FRAMES AT ALL ROOF TOP EQUIPMENT COORDINATE OPENINGS WITH MECHANICAL, ELECTRICAL, AND GENERAL CONTRACTORS.
 8. OPEN WEB STEEL JOISTS AND JOIST GIRDERS SHALL BE DESIGNATED BY THE MANUFACTURER TO SUPPORT THE MECHANICAL AND LATERAL LOADS SHOWN ON THE ROOF FRAMING PLANS IN ADDITION TO THE UNIFORM AND POINT LOADS SHOWN.
 9. WHERE SKYLIGHTS OR MECHANICAL UNITS INTERRUPT HORIZONTAL BRIDGING, PROVIDE CROSS BRIDGING AT JOIST SPACES ON EA SIDE. TYPICAL.
 10. WHERE DIAGONAL BRIDGING CONFLICTS WITH MECHANICAL DUCTS, REMOVE DIAGONAL BRIDGING AND REPLACE WITH HORIZONTAL BRIDGING (AFTER ROOF DECK IS IN PLACE).
 11. "-" INDICATES THAT THESE JOISTS SHALL BE DESIGNED FOR AN ADDITIONAL 1000# AT ANY TOP CHORD PANEL POINT. THIS LOAD IS TO BE ADDED TO THE GIRDER TOP CHORD LOAD. MULTIPLE "-" ARE ADDITIVE.
 12. JOIST DESIGNER SHALL DESIGN JOISTS AND SUPPLY ADDITIONAL BRIDGING AS REQUIRED FOR PSF NET UPLIFT DUE TO WIND. THERE IS NO UPLIFT ON GIRDERS.
 13. SEE SHEETS (S401) AND (S402) FOR MOMENT FRAME ELEVATIONS AND DETAILS ON SHEET (S701).
 14. SEE ARCHITECTURAL PLANS FOR ALL STEEL COLUMN LOCATIONS (DIMENSIONS).
 15. SPRINKLER DESIGNER SHALL COORDINATE THE SPRINKLER DESIGN WITH THE JOIST/GIRDER SHOP DRAWINGS.

MARKS AND SYMBOLS LEGEND

	SECTION MARK SHEET NUMBER
	FRAME EL MARK FRAME EL ON (S400's)
	MTL ROOF DECK, SEE GSN ON (S101)
	BRG WALL BLW
	STL COL. SEE SCHED ON (S304)
	LATERAL FRAME MOMENT CONNECTIONS
	GRAVITY MOMENT CONNECTIONS
	DOUBLE SHEAR CONNECTION, SEE SCHED ON (S303)
	JST TOP CHORD TIE, SEE ROOF FRAMING DETS ON (S701)
	HORIZ BRIDG
	X-BRIDG
	HORIZ BRIDG REOD FOR UPLIFT, SEE STL JST SUPPLIER FOR REQUIREMENTS
	MAS LITEL, SEE SCHED ON (S301)
	ROOF JST TOP CHORD SHALL BE DESIGNATED FOR AN ADDITIONAL LOAD OF KIPS IN TENSION AND COMPRESSION. LOADS ARE PROVIDED AT ULTIMATE STRENGTH LEVEL
	ROOF DRAIN, SEE ARCH AND MECH FOR EXACT LOCATION. SEE DET (B3/S701) FOR FRAMING
	SEISMIC FORCE RESISTING SYSTEM COLLECTOR, SEE DETS ON SHEET (S405) FOR CONNECTIONS
	L3x 1/4 BRACE, SEE (S400) SHEETS FOR ADDITIONAL INFORMATION
	L4x4x3/8 FRAME BRACING, SEE DETAILS ON (S404) AND (S406)
	L5x5x3/8 FRAME BRACING, SEE DETAILS ON SHEETS (S404) AND (S406)
	ROOF ANCHOR, SEE DETAIL (C3/S703). SEE ARCH/DWG FOR LOCATION
	SFRSC CONNECTION, SEE (S400) SHEETS FOR DETAILS
	INDICATES PERFORATED ROOF DECK, SEE ARCH

SNOW DRIFT LOADING DIAGRAM

D-1 MAX = 115 PSF L=23'-0"
 D-2 MAX = 65 PSF L=13'-0"

UNIFORM ROOF SNOW LOAD, SEE GSN

CRSA
 649 E. South Temple
 Salt Lake City, UT 84102
 801.355.5915

MWL
 11798 N. Lakeridge Pkwy.
 Ashland, VA 23005
 804-228-7473

State of Utah
 Department of Administrative Services

Division of Facilities
 Construction Management
 4110 State Office Building
 Salt Lake City, Utah 84114
 Phone: (801) 538 - 3018
 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

**Unified State Laboratory
 Module 2**
 4451 South 2700 West,
 Taylorsville, UT 84118

DFCM #: 13020300
Project #: 13062

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 08, 2014	ADD # 1
MAY 15, 2014	ADD # 2

CHECKED BY: TAK
 DRAWN BY: SJS

**PENTHOUSE FLOOR/
 ROOF FRAMING
 PLAN - AREA A**

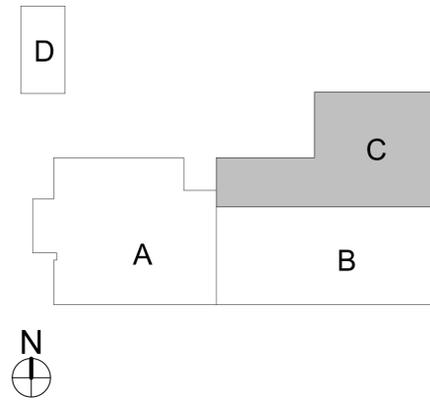
APRIL 21, 2014
 BID SET

NOTE:
 THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED APRIL 10, 2014
 DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE BUILDING IN GENERAL, I.e. GRID TO GRID DIMENSIONS OR DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL PLANS AND DETAILS FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.

DUNN
DUNN ASSOCIATES, INC
 Consulting Structural Engineers
 WWW.DUNN-SE.COM
 PH: 801-575-8877 FAX: 801-575-8875

S104A
 VOLUME 1

KEY PLAN



CRSA
649 E. South Temple
Salt Lake City, UT 84102
801.355.5915

MWL
11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services
Division of Facilities
Construction Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: 13062

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 08, 2014	ADD # 1
MAY 15, 2014	ADD # 2

CHECKED BY: TAK
DRAWN BY: SJS

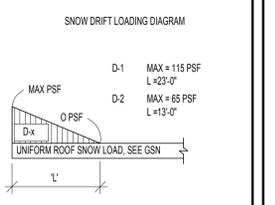
**PENTHOUSE FLOOR/
ROOF FRAMING
PLAN - AREA C**

**S104C
VOLUME 1**

DUNN
DUNN ASSOCIATES, INC
Consulting Structural Engineers
WWW.DUNN-SE.COM
PH: 801-575-8877 FAX: 801-575-8875

APRIL 21, 2014
BID SET

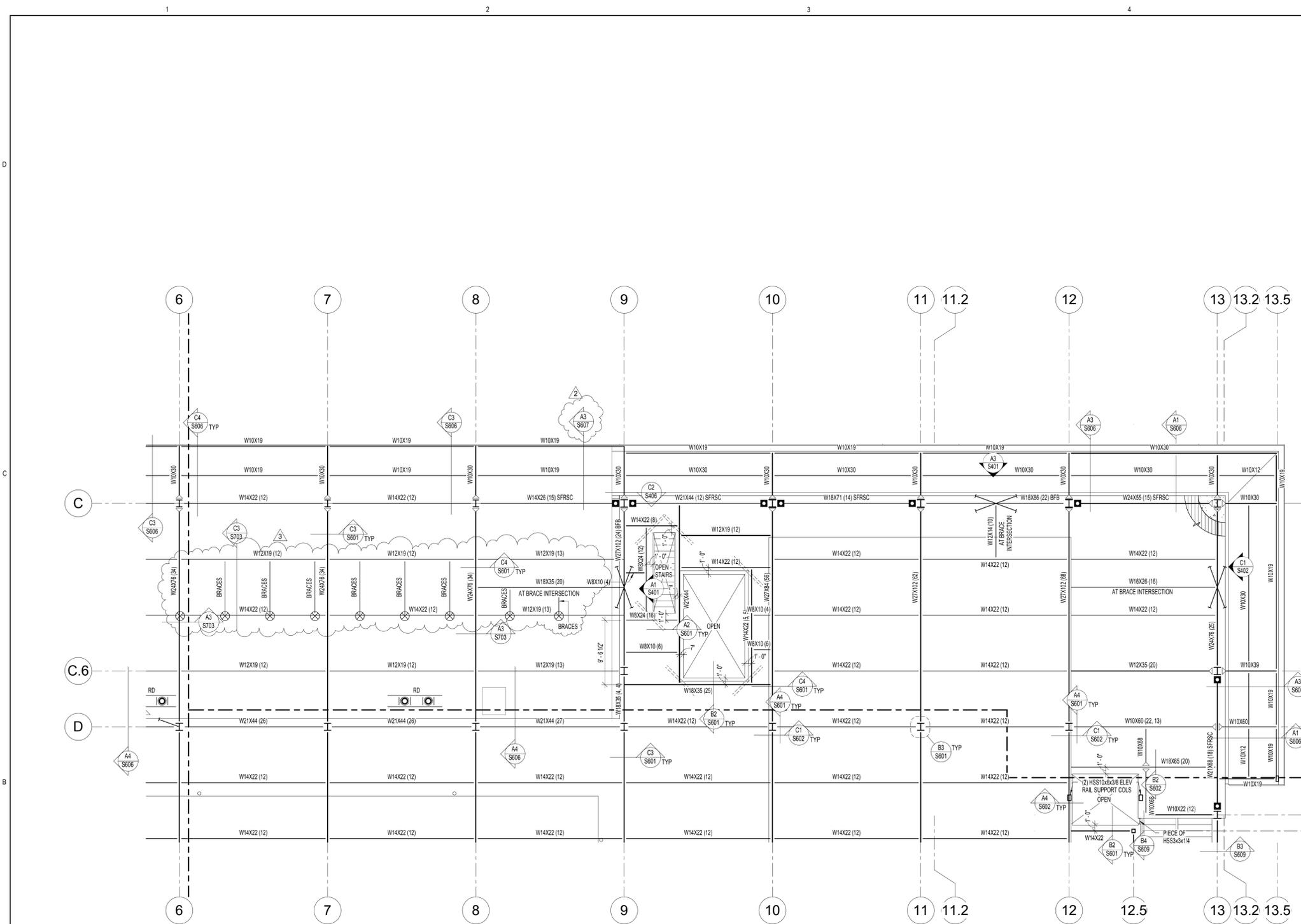
NOTE:
THESE STRUCTURAL DRAWINGS ARE BASED ON
ARCHITECTURAL DRAWINGS DATED APRIL 10, 2014
DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE
BUILDING IN GENERAL, I.E. GRID TO GRID DIMENSIONS OR
DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE
ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL
PLANS AND DETAILS FOR THE CONVENIENCE OF THE
CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS
WITH ARCHITECTURAL DRAWINGS.

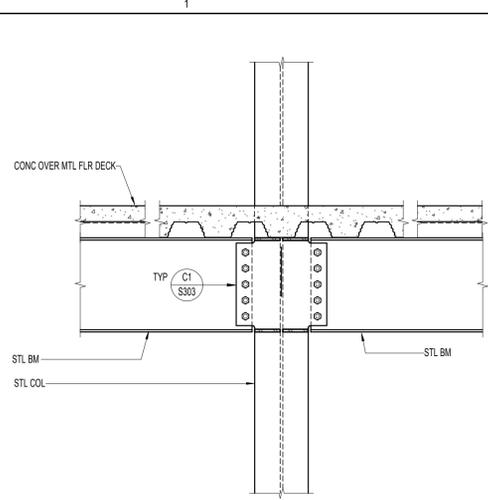


MARKS AND SYMBOLS LEGEND			
	SECTION MARK SHEET NUMBER		DOUBLE SHEAR CONNECTION. SEE SCHED ON (S303)
	FRAME EL MARK FRAME EL ON (S400S)		MAS LINTEL. SEE SCHED ON (S301)
	MTL ROOF DECK. SEE GSN ON (S101)		ROOF JST TOP CHORD SHALL BE DESIGNED FOR AN ADDITIONAL LOAD OF .4 KIPS IN TENSION AND COMPRESSION. LOADS ARE PROVIDED AT ULTIMATE STRENGTH LEVEL.
	BRG WALL BLW		OPEN WEB STEEL JOIST (TOTAL LIVE LOAD)
	STL COL. SEE SCHED ON (S304)		INDICATES PERFORATED ROOF DECK. SEE ARCH
	LATERAL FRAME MOMENT CONNECTIONS		L3x114 BRACE. SEE (S400) SHEETS FOR ADDITIONAL INFORMATION
	GRAVITY MOMENT CONNECTIONS		L4x10.9 FRAME BRACING. SEE DETAILS ON (S404) AND (S409)
	SFRC CONNECTION. SEE (S400) SHEETS FOR DETAILS		L5x5.3/8 FRAME BRACING. SEE DETAILS ON SHEETS (S404) AND (S406)

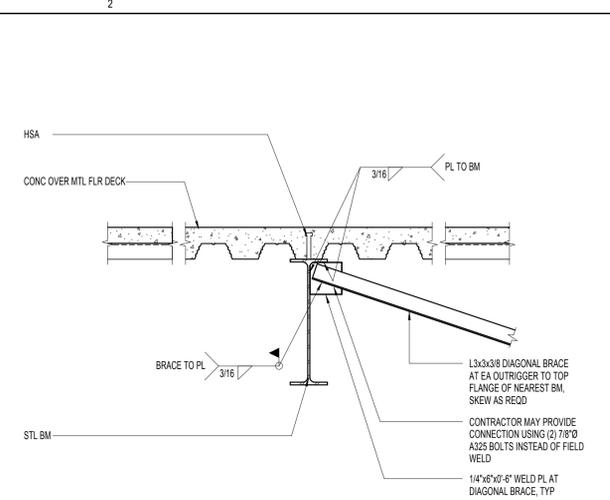
ROOF FRAMING PLAN NOTES:	
1. VERIFY ROOF SLOPES, DRAINS, AND DECK BEARING ELEVATIONS WITH ARCHITECTURAL DRAWINGS. SEE ROOF FRAMING DETAILS ON SHEET (S701).	8. WHERE SKYLIGHTS OR MECHANICAL UNITS INTERRUPT HORIZONTAL BRIDGING, PROVIDE CROSS BRIDGING AT JOIST SPACES ON EA SIDE. TYPICAL.
2. ALL JOISTS SHALL BE FLUSH FRAMED UNO.	9. WHERE DIAGONAL BRIDGING CONFLICTS WITH MECHANICAL DUCTS, REMOVE DIAGONAL BRIDGING AND REPLACE WITH HORIZONTAL BRIDGING (AFTER ROOF DECK IS IN PLACE).
3. ALL ROOF OPENINGS SHALL BE FRAMED AS INDICATED IROOF FRAMING DETAILS ON SHEET (S701).	10. * - INDICATES THAT THESE JOISTS SHALL BE DESIGNED FOR AN ADLOAD OF 1000# AT ANY TOP CHORD PANEL POINT. THIS LOAD IS TO BE ADDED TO THE GRIDER TOP CHORD LOAD. MULTIPLE "*" ARE ADDITIVE.
4. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR CONCENTRATED LOADS LOCATED FURTHER THAN 6" FROM JOIST/GIRDER PANEL JOINT.	11. JOIST DESIGNER SHALL DESIGN JOISTS AND SUPPLY ADDITIONAL BRIDGING AS REQUIRED FOR 8 PSF NET UPLIFT DITO WIND. THERE IS NO UPLIFT ON GRIDERS.
5. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR MECHANICAL UNITS HUNG BELOW JOISTS.	12. SEE SHEETS (S401) AND (S402) FOR FRAME ELEVATIONS.
6. VERIFY SIZE, WEIGHT, AND LOCATION OF ALL ROOF TOP MECHANICAL UNITS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. SEE ROOF FRAMING DETAILS ON SHEET (S701) FOR STEEL FRAMES AT ALL ROOF TOP EQUIPMENT. COORDINATE OPENINGS WITH MECHANICAL, ELECTRICAL, AND GENERAL CONTRACTORS.	13. SEE ARCHITECTURAL PLANS FOR ALL STEEL COLUMN LOCATIONS (DIMENSIONS).
7. OPEN WEB STEEL JOISTS AND JOIST GRIDERS SHALL BE DESIGNATED BY THE MANUFACTURER TO SUPPORT THE MECHANICAL AND LATERAL LOADS SHOWN ON THE ROOF FRAMING PLANS IN ADDITION TO THE UNIFORM AND POINT LOADS SHOWN.	14. SPRINKLER DESIGNER SHALL COORDINATE THE SPRINKLER DESIGN WITH THE JOIST/GIRDER SHOP DRAWINGS.

B1 PENTHOUSE FLOOR/ ROOF FRAMING PLAN - AREA C
S104C SCALE: 1/8" = 1'-0"

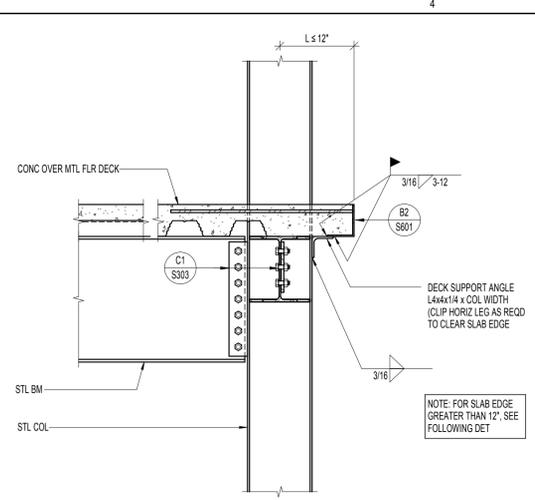




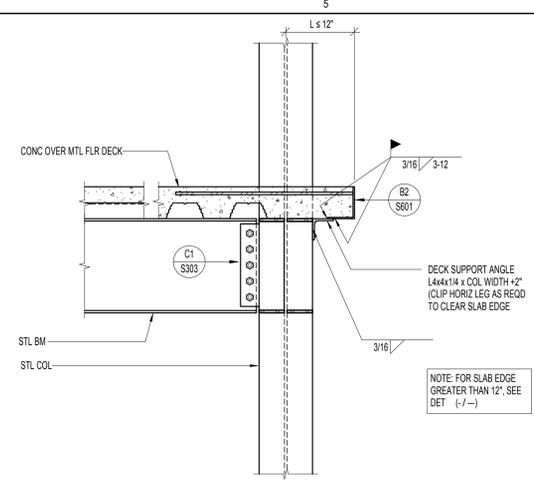
C1 TYPICAL BOLTED CONNECTION TO STEEL COLUMN WEB
S602 NO SCALE



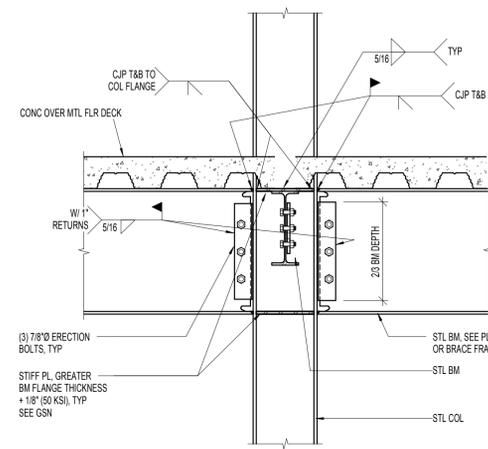
C2 TYPICAL KICKER CONNECTION DETAIL AT STEEL BEAM
S602 NO SCALE



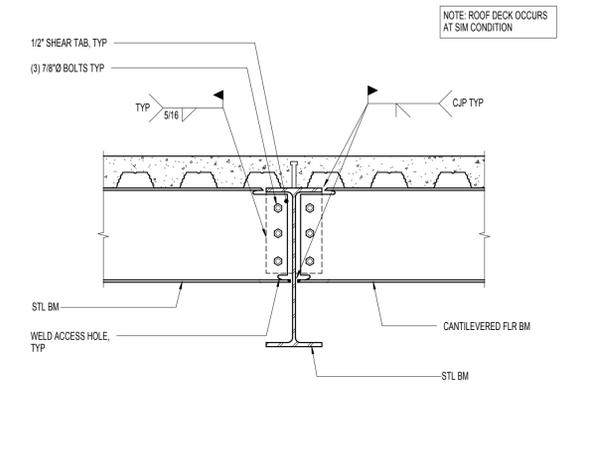
C3 TYPICAL SLAB EDGE AT STEEL COLUMN FLANGE (OVERHANG 'L' ≤ 12')
S602 NO SCALE



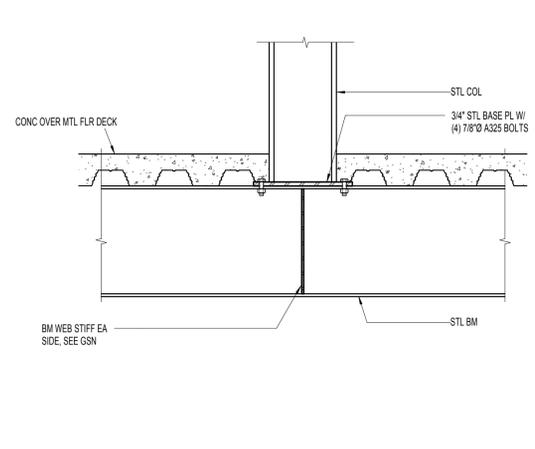
C4 TYPICAL SLAB EDGE AT STEEL COLUMN WEB (OVERHANG 'L' ≤ 12')
S602 NO SCALE



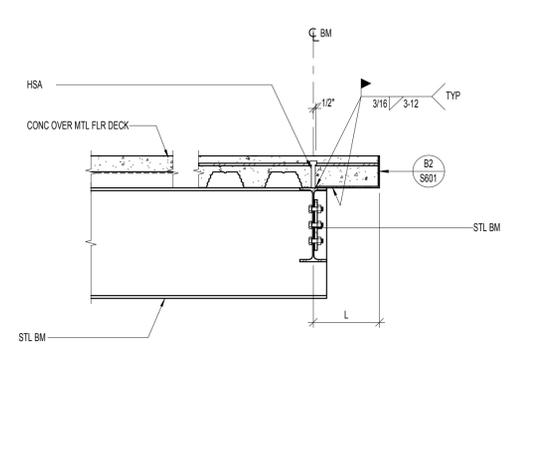
B1 CANTILEVERED BEAM CONNECTION AT COLUMN
S602 NO SCALE



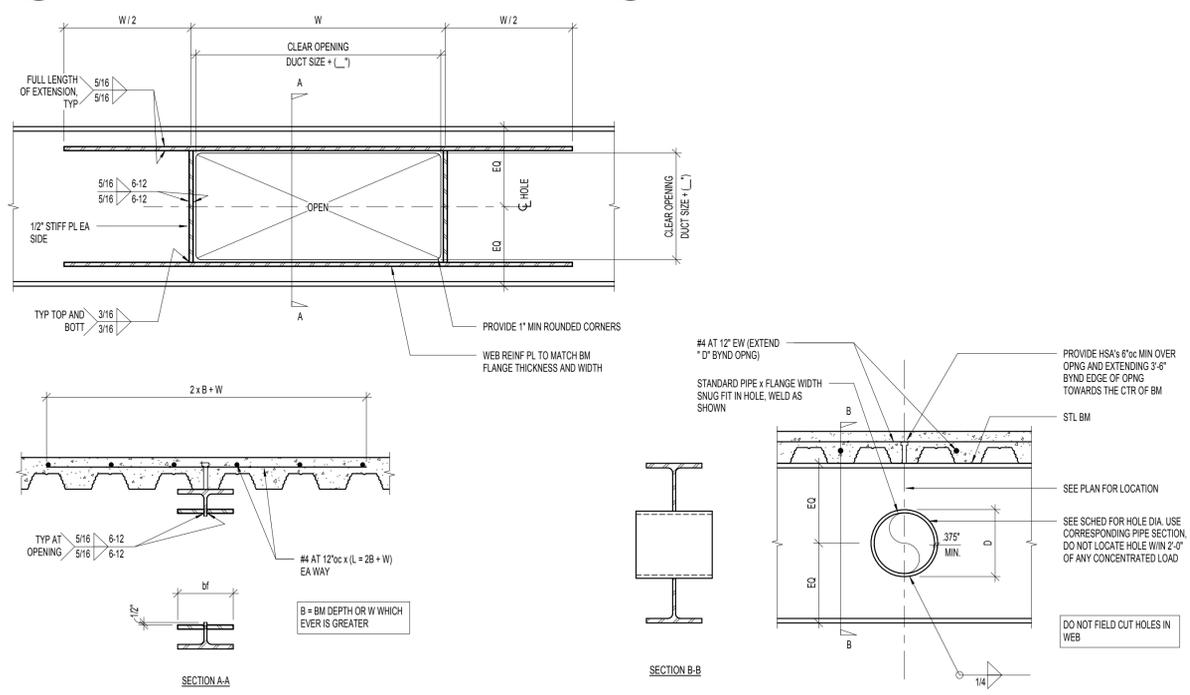
B2 CANTILEVER BEAM CONNECTION AT BEAM
S602 NO SCALE



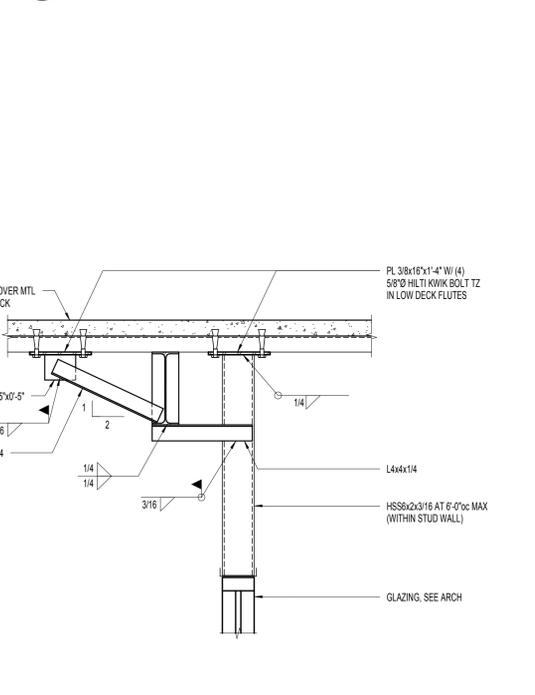
B3 STEEL COLUMN AND TRANSFER BEAM CONNECTION
S602 NO SCALE



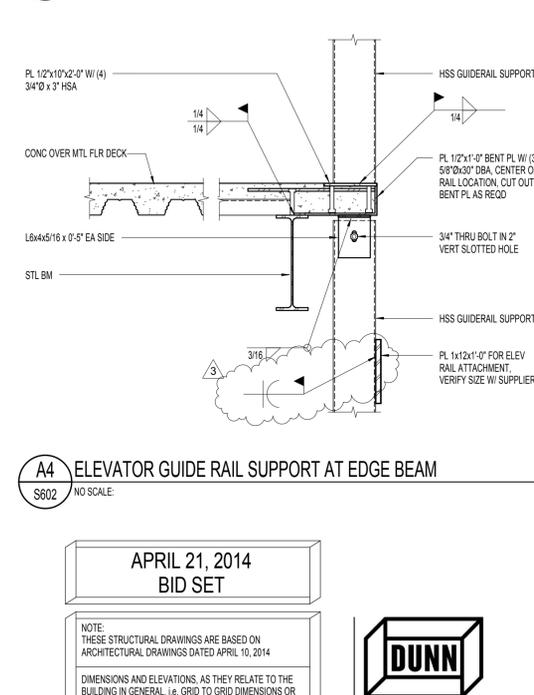
B4 EDGE BEAM SUPPORT AT CANTILEVER BEAM
S602 NO SCALE



A1 PENETRATION THROUGH STEEL BEAM
S602 NO SCALE



A3 GLAZING SUPPORT DETAIL
S602 NO SCALE



A4 ELEVATOR GUIDE RAIL SUPPORT AT EDGE BEAM
S602 NO SCALE

CRSA

649 E. South Temple
Salt Lake City, UT 84102
801.355.5915

MWL

11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

Unified State Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: 13062

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 08, 2014	ADD # 1
MAY 15, 2014	ADD # 2

CHECKED BY: TAK
DRAWN BY: SJS

FLOOR FRAMING
DETAILS

S602
VOLUME 1

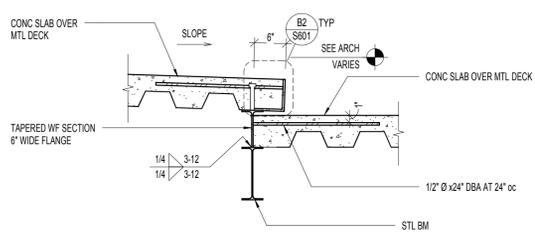
APRIL 21, 2014
BID SET

NOTE: THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED APRIL 10, 2014. DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE BUILDING IN GENERAL, I.E. GRID TO GRID DIMENSIONS OR DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL PLANS AND DETAILS FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.

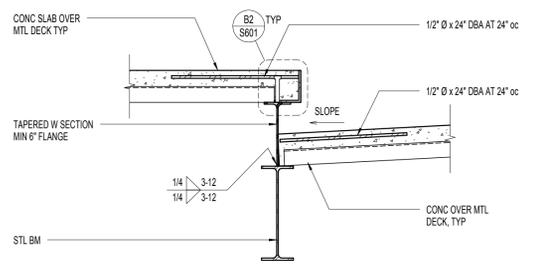


DUNN ASSOCIATES, INC
Consulting Structural Engineers

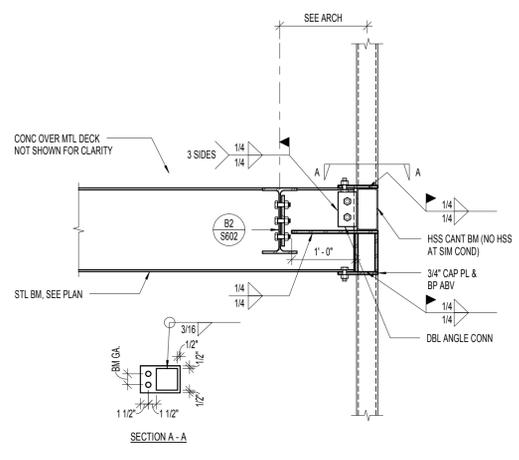
WWW.DUNN-SE.COM
PH: 801-575-8877 FAX: 801-575-8875



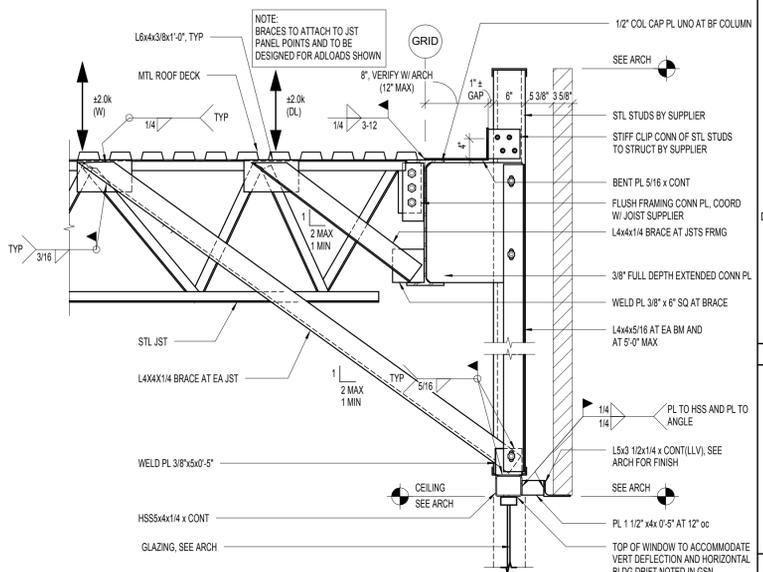
C1 CONCRETE ROOF STEP
S607 NO SCALE:



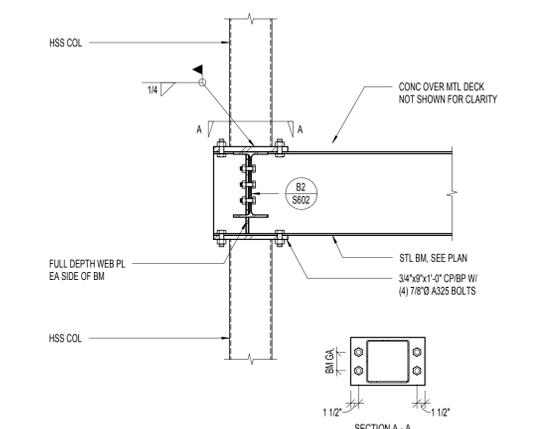
C2 CONCRETE ROOF STEP
S607 NO SCALE:



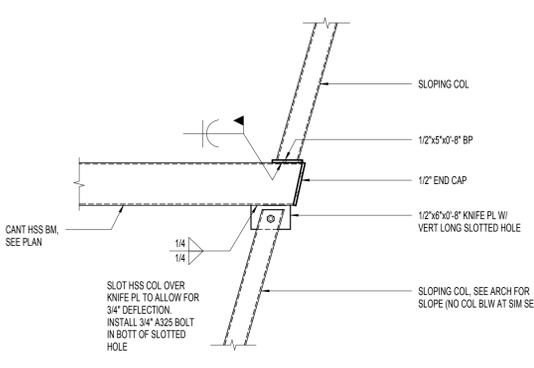
C3 DETAIL
S607 NO SCALE:



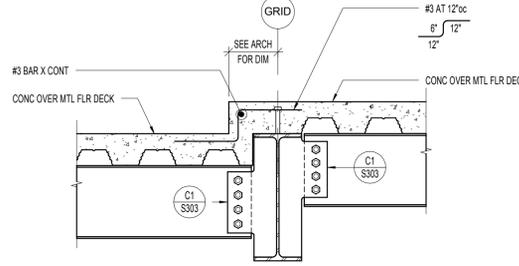
C4 DETAIL
S607 NO SCALE:



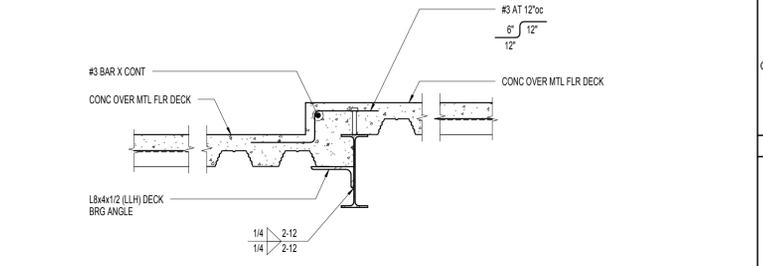
B1 DETAIL
S607 NO SCALE:



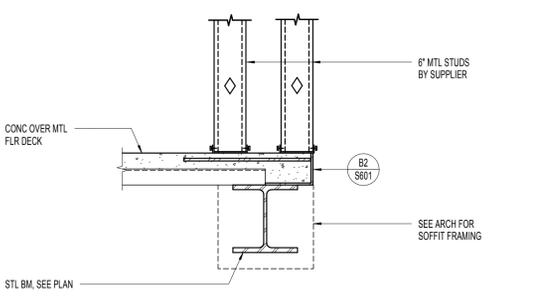
B2 DETAIL
S607 NO SCALE:



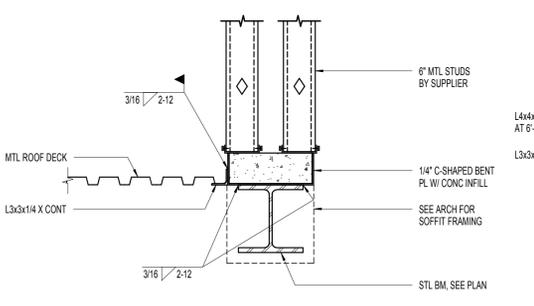
B3 BEAM CONNECTION AT FLOOR RECESS
S607 NO SCALE:



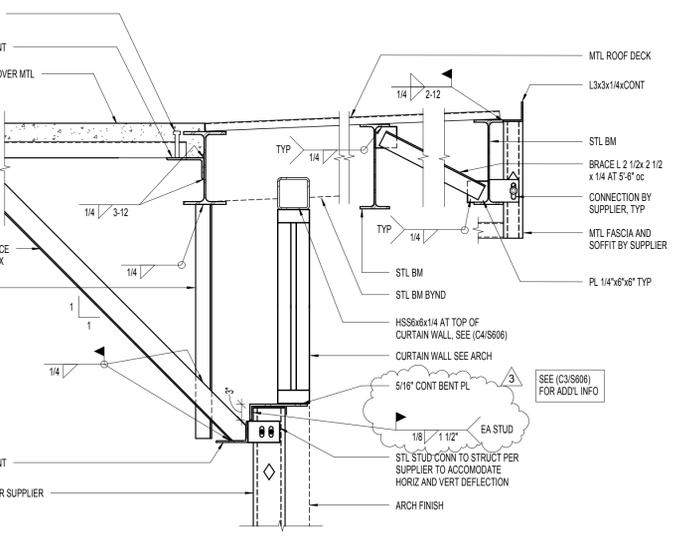
B4 FLOOR RECESS
S607 NO SCALE:



A1 DETAIL
S607 NO SCALE:



A2 DETAIL
S607 NO SCALE:



A3 DETAIL
S607 NO SCALE:

APRIL 21, 2014
BID SET

NOTE: THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED APRIL 10, 2014. DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE BUILDING IN GENERAL, I.E. GRID TO GRID DIMENSIONS OR DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL PLANS AND DETAILS FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.



DUNN ASSOCIATES, INC
Consulting Structural Engineers

WWW.DUNN-SE.COM
PH: 801-575-8877 FAX: 801-575-8875



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

Unified State Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

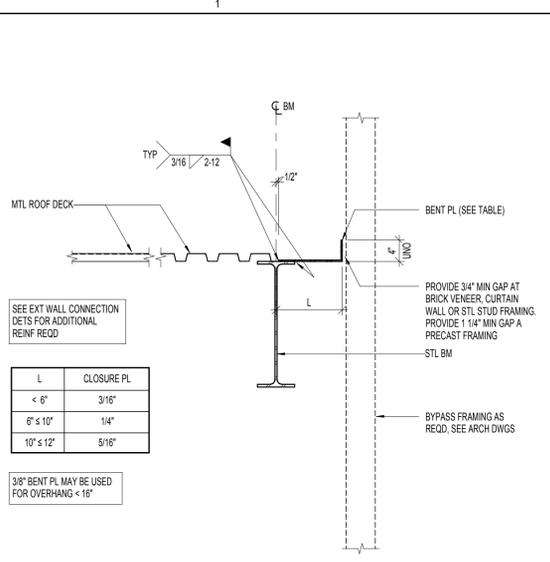
Project #: 13062

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 08, 2014	ADD # 1
MAY 15, 2014	ADD # 2

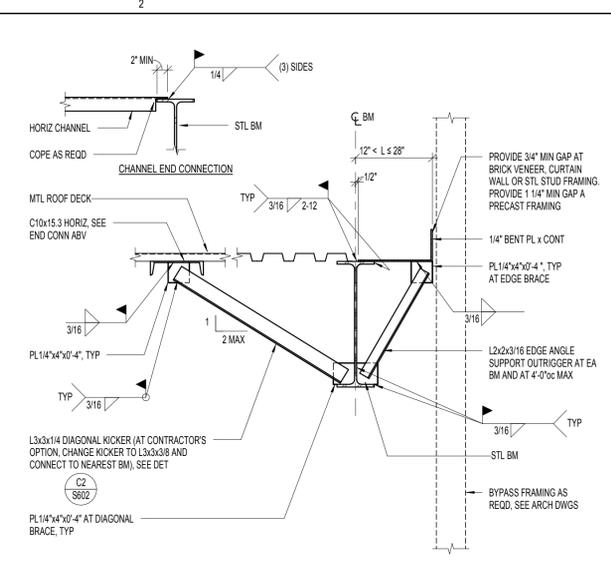
CHECKED BY: TAK
DRAWN BY: SJS

FLOOR FRAMING DETAILS

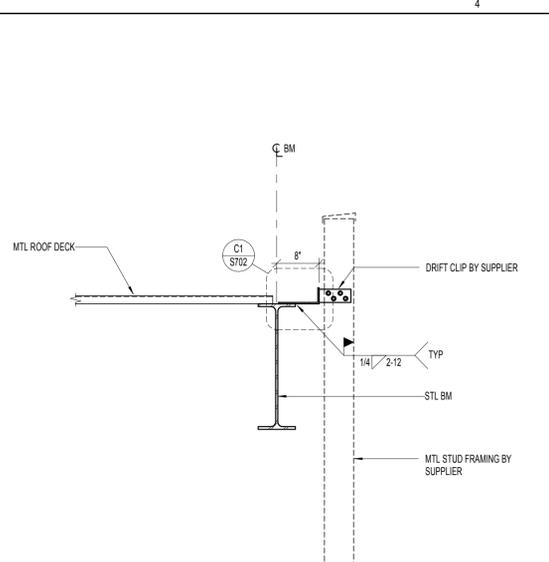
S607
VOLUME 1



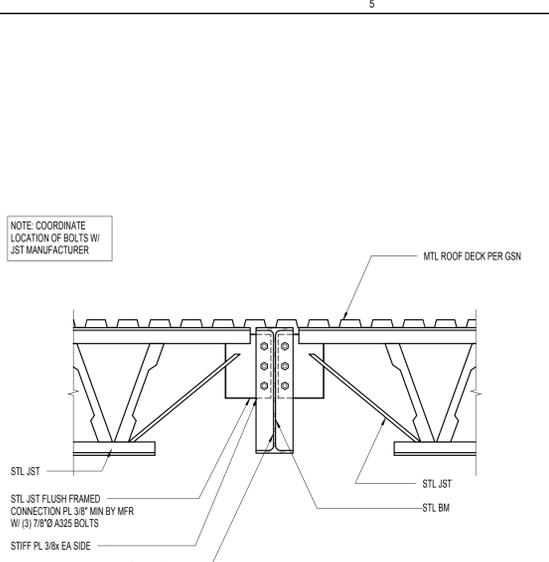
C1 TYPICAL CLOSURE PLATE (OVERHANG "L" ≤ 12")
S702 NO SCALE.



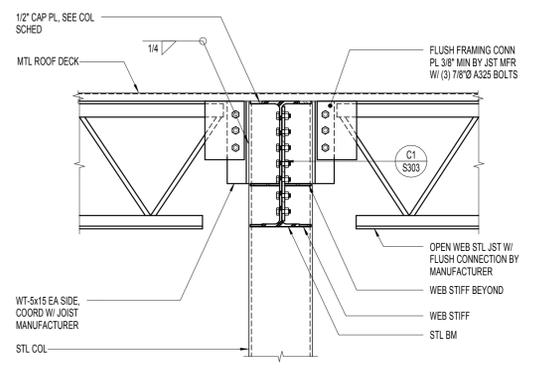
C2 TYPICAL CLOSURE PLATE (OVERHANG 12" < "L" ≤ 28")
S702 NO SCALE.



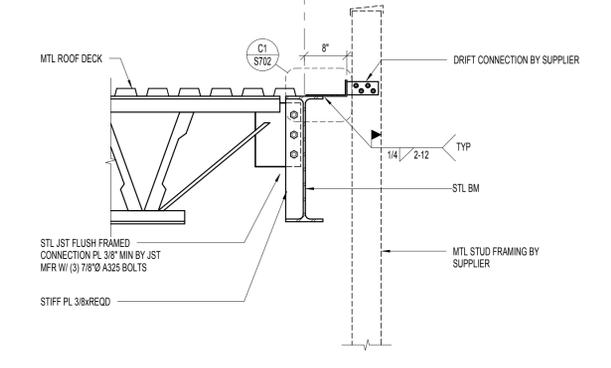
C3 ROOF DETAIL
S702 NO SCALE.



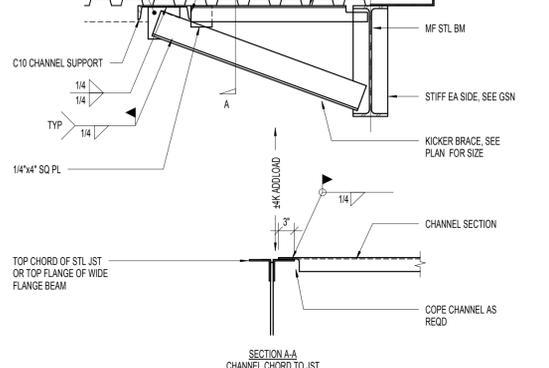
C4 ROOF DETAIL
S702 NO SCALE.



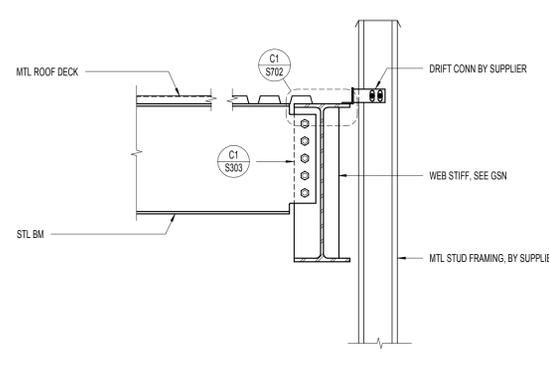
B1 TYPICAL BOLTED CONNECTION TO HSS COLUMN
S702 NO SCALE.



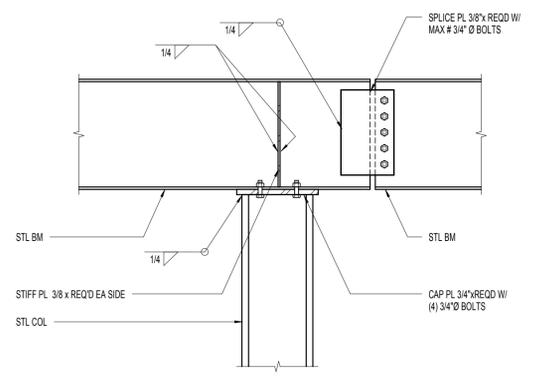
B2 ROOF DETAIL
S702 NO SCALE.



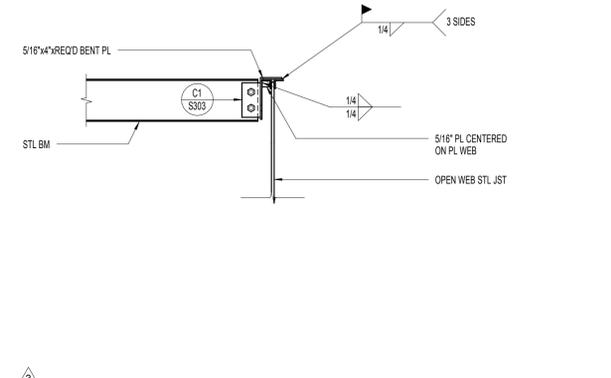
B3 MOMENT FRAME BEAM BRACE
S702 NO SCALE.



B4 TYPICAL BEAM CONN
S702 NO SCALE.



A1 ROOF DETAIL
S702 NO SCALE.



A2 TYPICAL STEEL BEAM TO OPEN WEB JOIST
S702 NO SCALE.

APRIL 21, 2014
BID SET

NOTE: THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED APRIL 10, 2014. DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE BUILDING IN GENERAL, I.E. GRID TO GRID DIMENSIONS OR DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL PLANS AND DETAILS FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.



DUNN ASSOCIATES, INC
Consulting Structural Engineers

WWW.DUNN-SE.COM
PH: 801-575-8877 FAX: 801-575-8875

CRSA

649 E. South Temple
Salt Lake City, UT 84102
801.355.5915

MWL

11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: 13062

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 08, 2014	ADD # 1
MAY 15, 2014	ADD # 2

CHECKED BY: TAK
DRAWN BY: SJS

**ROOF FRAMING
DETAILS**

S702
VOLUME 1

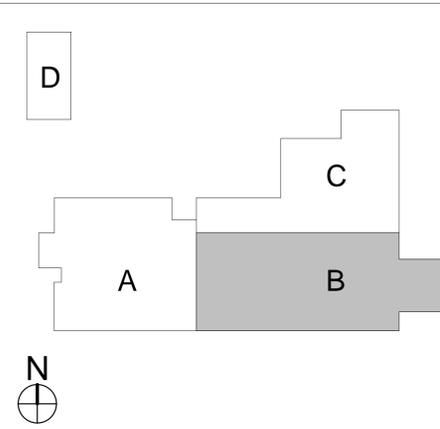
KEYED NOTES

- 1 COLUMN WRAP TYPE E, SEE A5/AE520
- 2 COLUMN WRAP TYPE C, SEE B5/AE520
- 3 FURR WITH 1-1/2" METAL FRAMING, PROVIDE DETAIL SIMILAR TO COLUMN WRAP TYPE B, COORDINATE WITH MECHANICAL.

GENERAL NOTES

- GENERAL CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND SHALL REPORT TO THE ARCHITECT ANY UNKNOWN CONDITIONS, ERRORS OR CONFLICTS IN THE DRAWINGS BEFORE BEGINNING WORK.
- DO NOT SCALE DRAWINGS.

KEY PLAN



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



MEHRDAD SAMEI
04.28.2014
ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

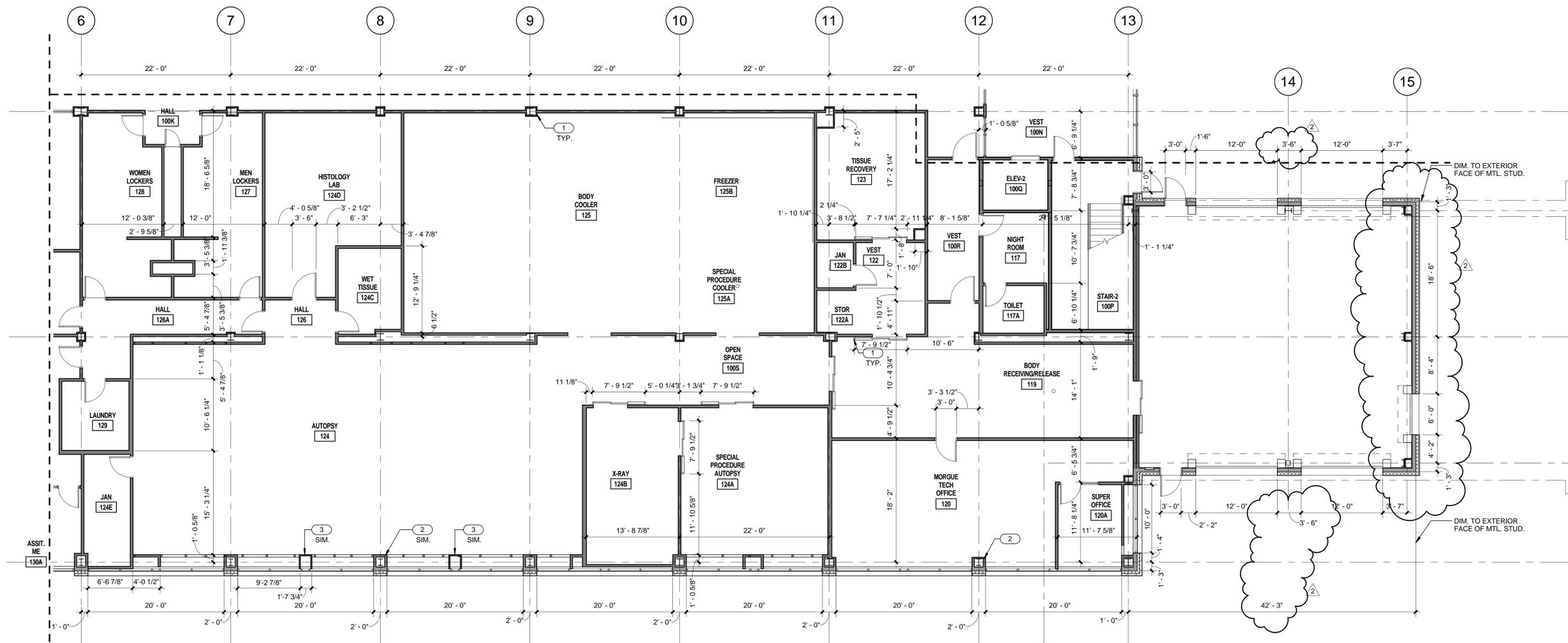
DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

**LEVEL 1
DIMENSION PLAN
AREA B**

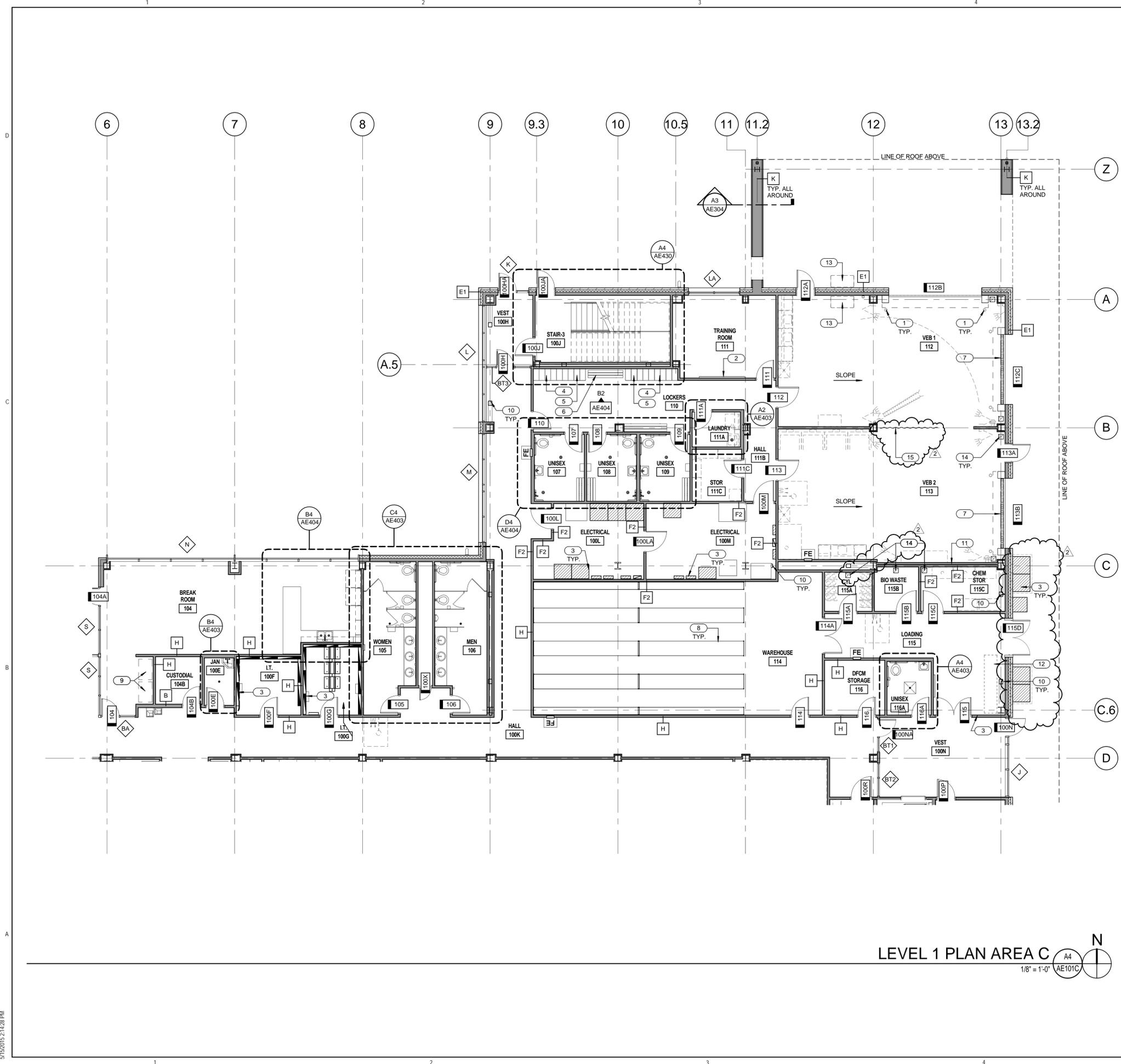
AE101B.D

VOLUME 1



LEVEL 1 DIMENSION PLAN AREA B
1/8" = 1'-0" AE101B.D

C:\Users\ferando\Documents_A_13024_ModB_2013_ferando.rvt 5/15/2015 2:14:22 PM



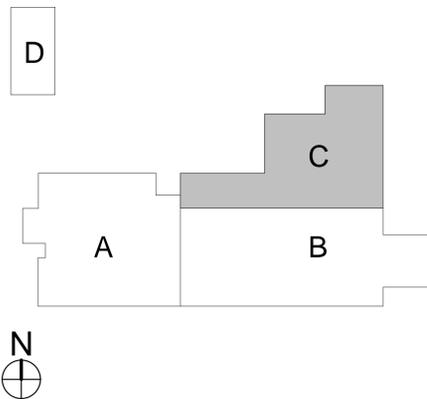
GENERAL NOTES

- GENERAL CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND SHALL REPORT TO THE ARCHITECT ANY UNKNOWN CONDITIONS, ERRORS OR CONFLICTS IN THE DRAWINGS BEFORE BEGINNING WORK.
 - DO NOT SCALE DRAWINGS.
 - ITEMS SHOWN BY HIDDEN LINE ARE SPECIFIED BY OTHER SECTIONS.
- ALL WALLS TO BE TYPE "A" U.N.O. ON PLAN A
- FIRE EXTINGUISHER FE

KEYED NOTES

- BOLLARD. SEE DETAIL 16/C401.
- WHITEBOARD. SEE ACCESSORY SCHEDULE.
- ELECTRICAL PANEL. SEE ELECTRICAL DRAWINGS.
- LOCKERS. SEE ACCESSORY SCHEDULE.
- CUBBIES. SEE INTERIOR ELEVATIONS.
- BENCH. SEE ACCESSORY SCHEDULE.
- TRENCH DRAIN. SEE PLUMBING DRAWINGS.
- STORAGE SHELVING. SEE SHELVING DETAILS.
- VENDING MACHINES. PROVIDED BY OWNER.
- BRACE FRAME. PAINT WHERE EXPOSED. SEE STRUCTURAL.
- FURR WALL WITH WALL TYPE H. SEE FINISH PLANS FOR FINISH.
- FIRE RISER. SEE PLUMBING DRAWINGS.
- FOLD DOWN SURFACE. SEE I.L. DRAWINGS.
- MECHANICAL DUCT. SEE MECHANICAL DRAWINGS.
- CURTAIN. SEE ACCESSORY SCHEDULE.

KEY PLAN



LEVEL 1 PLAN AREA C
1/8" = 1'-0" A4 AE101C



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

**LEVEL 1 PLAN
AREA C**

AE101C
VOLUME 1



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



Mehrdad Same
04.28.2014
ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**

4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE: APRIL 21, 2014

ISSUE TYPE: BID SET

MAY 15, 2015

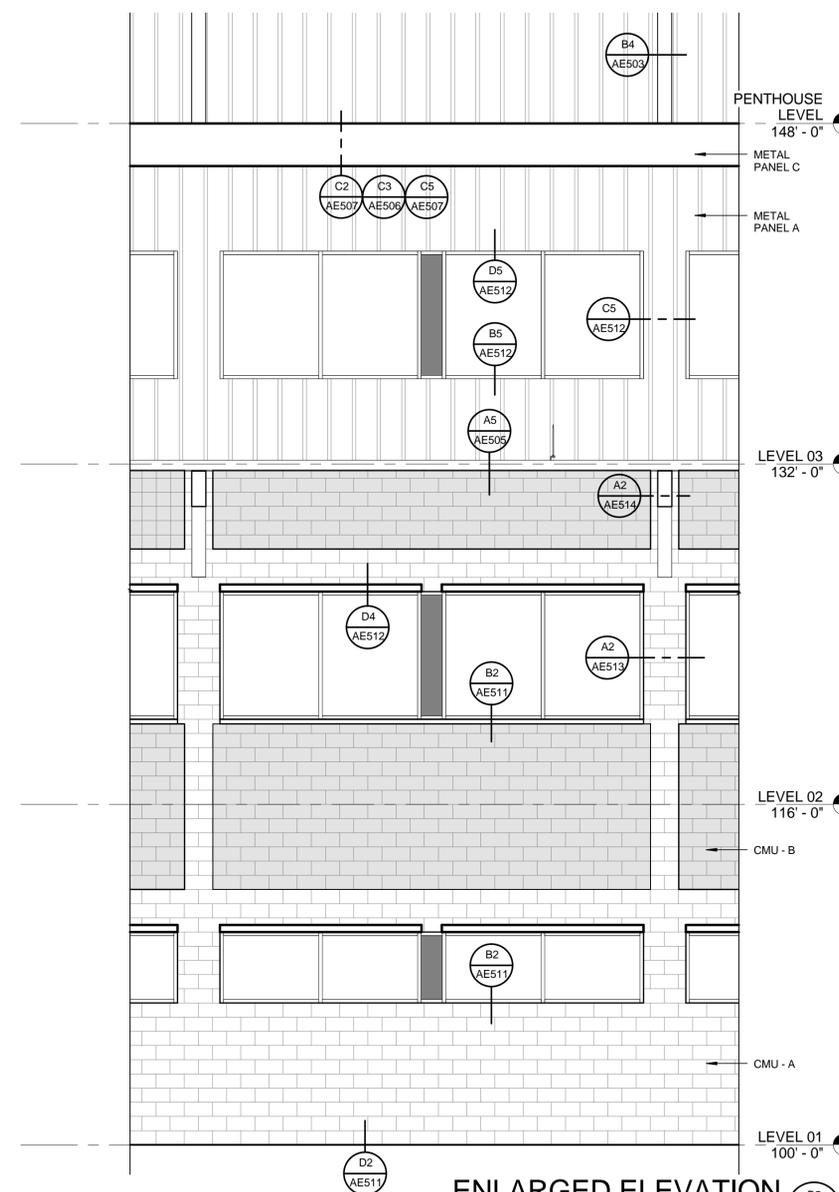
ADD # 2

CHECKED BY: J. NIELSEN

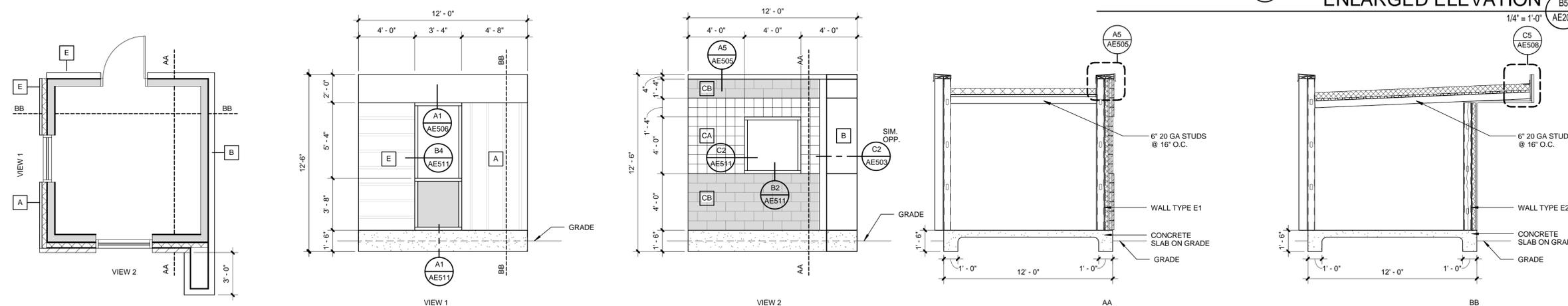
DRAWN BY: F. PITORE

MOCK-UPS

AE205
VOLUME 1

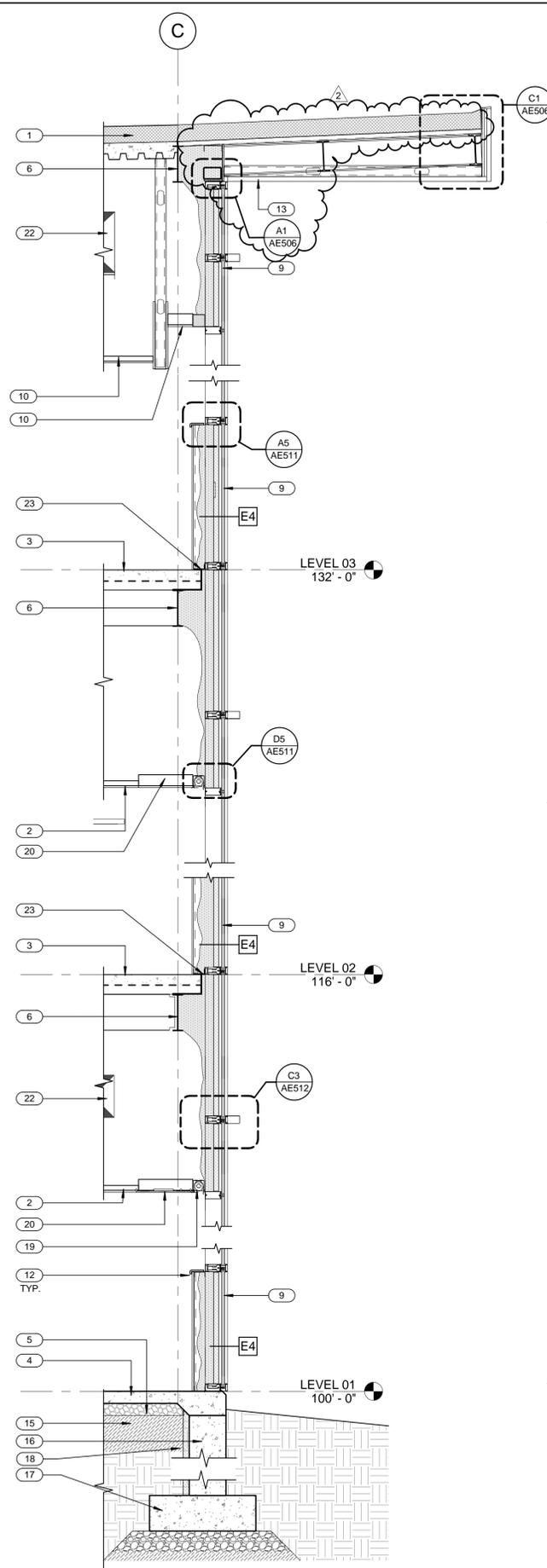


ENLARGED ELEVATION

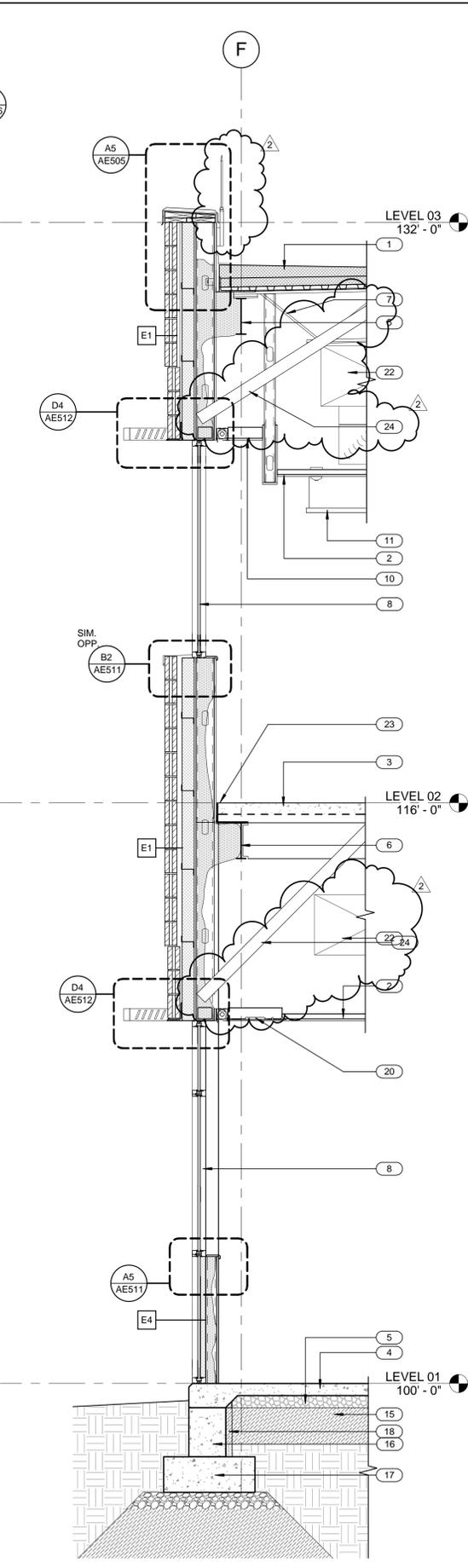


MOCK-UP SAMPLES

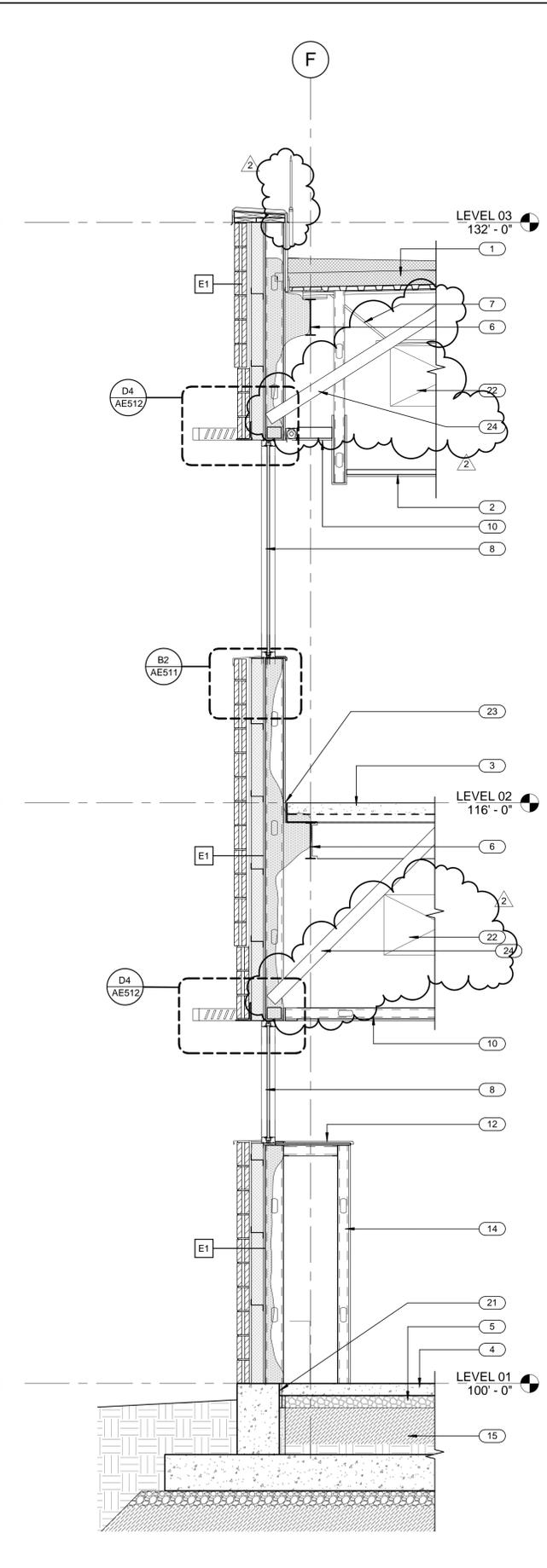
NOTE: - MOCK-UPS SHALL BE CONSTRUCTED WITHIN 6 MONTHS OF NOTICE TO PROCEED.
- MOCK-UP SHALL INCLUDE STRUCTURAL FRAMING TO SUPPORT ITSELF.
- BRICK MOCK-UP SHALL INCLUDE SAME WALL CONSTRUCTION AS SPECIFIED IN THE DRAWINGS



WALL SECTION A2
1/2" = 1'-0"
AE303



WALL SECTION A3
1/2" = 1'-0"
AE303



WALL SECTION A4
1/2" = 1'-0"
AE303

GENERAL NOTES

- GENERAL CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND SHALL REPORT TO THE ARCHITECT ANY UNKNOWN CONDITIONS, ERRORS OR CONFLICTS IN THE DRAWINGS BEFORE BEGINNING WORK.
- DO NOT SCALE DRAWINGS.

KEYED NOTES

- ROOF ASSEMBLY. SEE ROOF TYPES.
- LAY-IN CEILING. SEE CEILING PLANS.
- CONCRETE SLAB ON DECK. SEE STRUCTURAL.
- 30" CLEAR AREA.
- 4" FREE DRAINING GRAVEL.
- STEEL BEAM. PAINT WHERE EXPOSED. SEE STRUCTURAL.
- STEEL JOIST. PAINT WHERE EXPOSED. SEE STRUCTURAL.
- ALUM. STOREFRONT SYSTEM. SEE WINDOW TYPES.
- CURTAIN WALL SYSTEM. SEE WINDOW TYPES.
- GYP. BD. CEILING. SEE CEILING PLAN.
- LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
- WINDOW SILL. SEE FINISH LEGEND.
- METAL SOFFIT. SEE CEILING PLAN.
- FURR WALL WITH WALL TYPE H. SEE FINISH PLANS FOR FINISH.
- 12" STRUCTURAL FILL. SEE GEOTECH REPORT.
- REINFORCED CONCRETE FOUNDATION WALL. SEE STRUCTURAL.
- REINFORCED CONCRETE FOOTING. SEE STRUCTURAL.
- 2" RIGID PERIMETER INSULATION.
- ROLLER WINDOW SHADES TYP. ALL EXTERIOR WINDOWS. REFER TO ACCESSORY SCHEDULE. SEE SPECS.
- RADIANT CEILING PANEL. SEE MECHANICAL DRAWINGS.
- EXPANSION JOINT.
- MECHANICAL DUCT. SEE MECHANICAL DRAWINGS.
- FIRE STOPPING. SEE AVAILABLE UL ASSEMBLIES SHOWN ON GF006-010.
- STEEL BRACE. SEE STRUCTURAL.

CRSA
649 E. South Temple
Salt Lake City, UT 84102
801.355.5915

MWL
11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

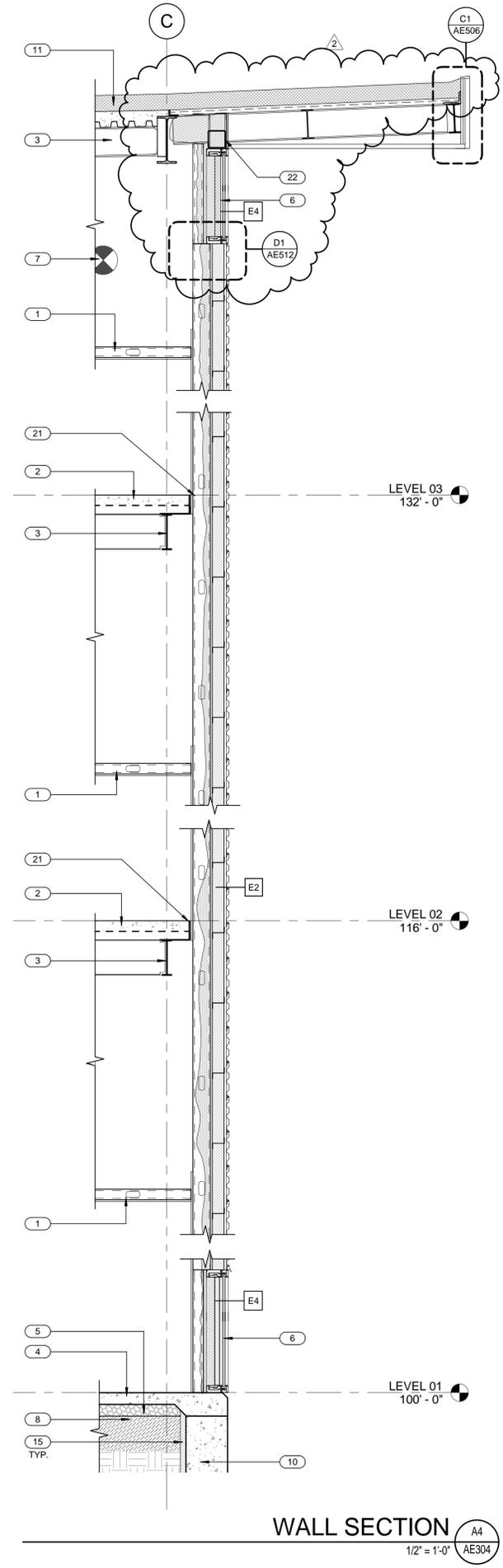
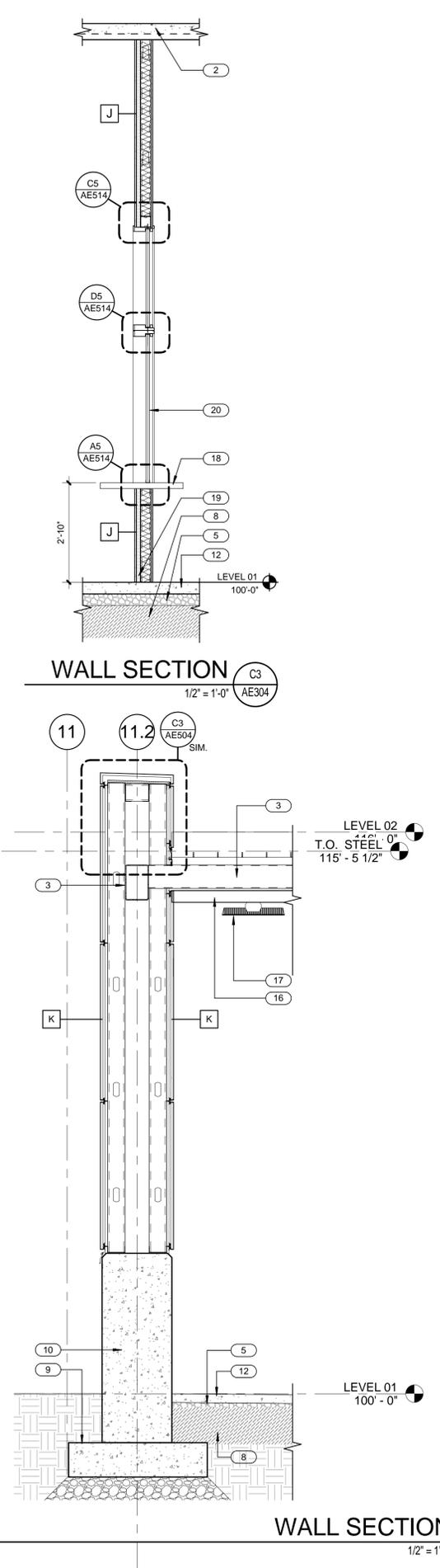
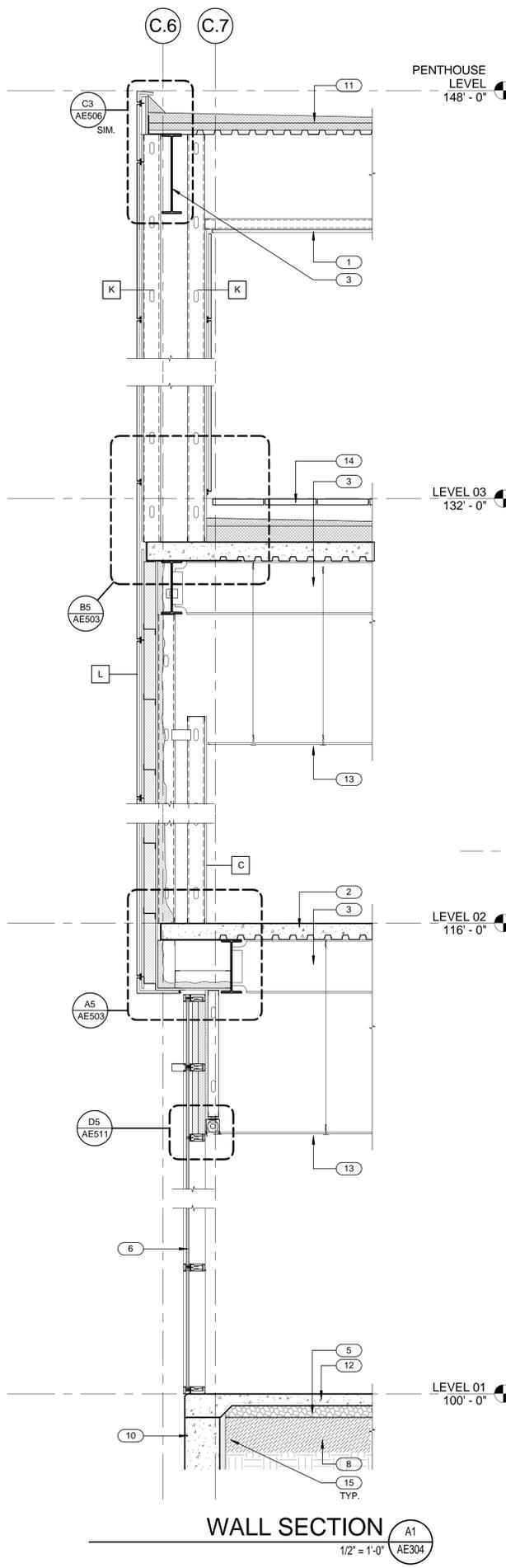
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY:	J. NIELSEN
DRAWN BY:	F. PITORE

WALL SECTIONS

AE303
VOLUME 1



GENERAL NOTES

- GENERAL CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND SHALL REPORT TO THE ARCHITECT ANY UNKNOWN CONDITIONS, ERRORS OR CONFLICTS IN THE DRAWINGS BEFORE BEGINNING WORK.
- DO NOT SCALE DRAWINGS.

KEYED NOTES

- 1 GYP. BD. CEILING. SEE CEILING PLAN.
- 2 CONCRETE SLAB ON DECK. SEE STRUCTURAL.
- 3 STEEL BEAM. PAINT WHERE EXPOSED. SEE STRUCTURAL.
- 4 30" CLEAR AREA.
- 5 4" FREE DRAINING GRAVEL.
- 6 CURTAIN WALL SYSTEM. SEE WINDOW TYPES.
- 7 MECHANICAL DUCT. SEE MECHANICAL DRAWINGS.
- 8 12" STRUCTURAL FILL. SEE GEOTECH REPORT.
- 9 REINFORCED CONCRETE FOOTING. SEE STRUCTURAL.
- 10 REINFORCED CONCRETE FOUNDATION WALL. SEE STRUCTURAL.
- 11 ROOF ASSEMBLY. SEE ROOF TYPES.
- 12 CONCRETE SLAB ON GRADE. SEE STRUCTURAL.
- 13 LAY-IN CEILING. SEE CEILING PLANS.
- 14 PAVERS. SEE SHEET AE/121.
- 15 2" RIGID PERIMETER INSULATION
- 16 SOFFIT. SEE CEILING PLANS
- 17 LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
- 18 TRANSACTION COUNTER. SEE WINDOW TYPES.
- 19 INSTALL BULLET RESISTANT PANEL WITH FULL LOAD RESTING SECURELY AGAINST SLAB. ANCHOR TO PLATE AND WALL AS PER MANUFACTURER RECOMMENDATIONS.
- 20 BULLET RESISTANT GLAZING.
- 21 FIRE STOPPING. SEE AVAILABLE UL ASSEMBLIES SHOWN ON GF006-010.
- 22 TUBE STEEL. SEE STRUCTURAL.



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



Mehرداد Same
04.28.2014
ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

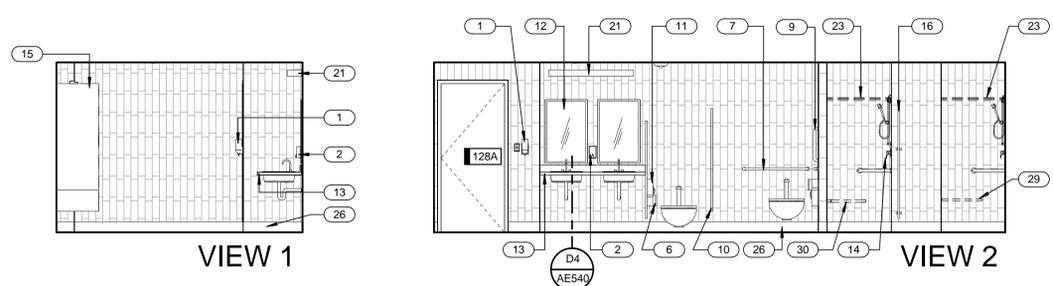
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

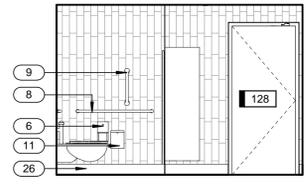
WALL SECTIONS

AE304
VOLUME 1

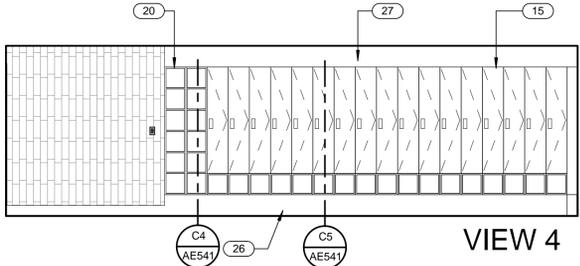


VIEW 1

VIEW 2

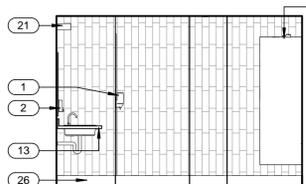


VIEW 3

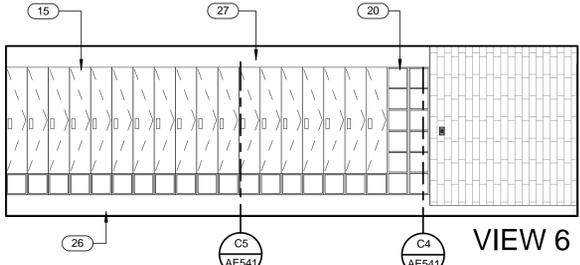


VIEW 4

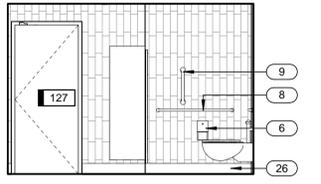
WOMEN LOCKER ROOM 128
1/4" = 1'-0" C2 AE402



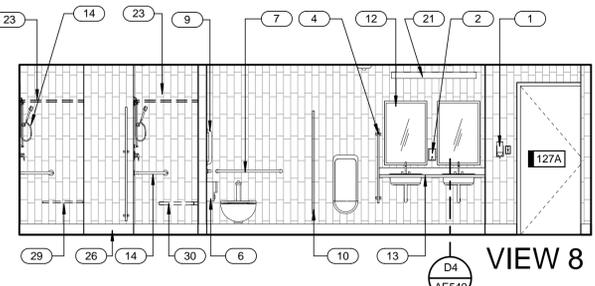
VIEW 5



VIEW 6

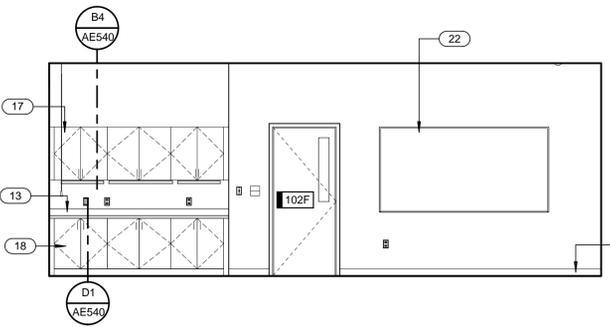


VIEW 7

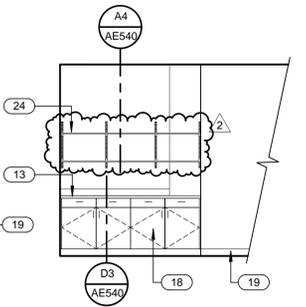


VIEW 8

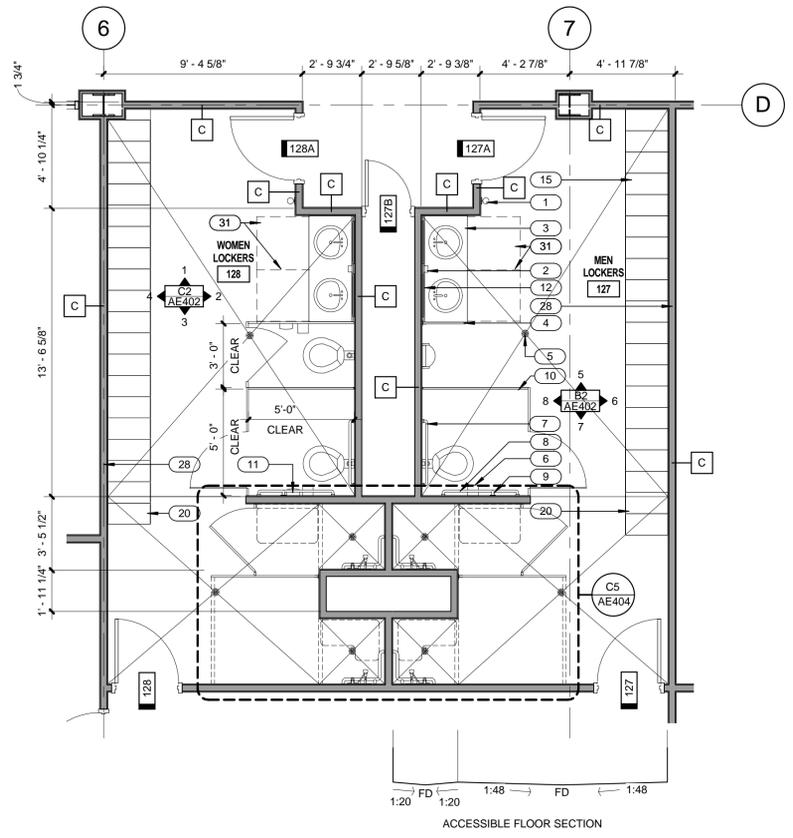
MEN LOCKER ROOM 127
1/4" = 1'-0" B2 AE402



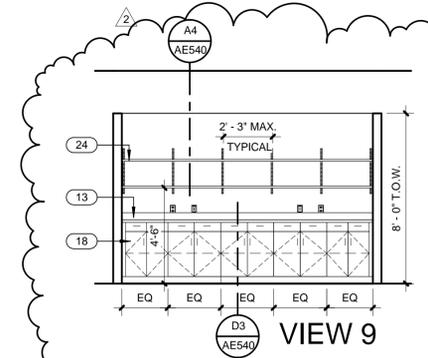
CONFERENCE 102F
1/4" = 1'-0" B3 AE402



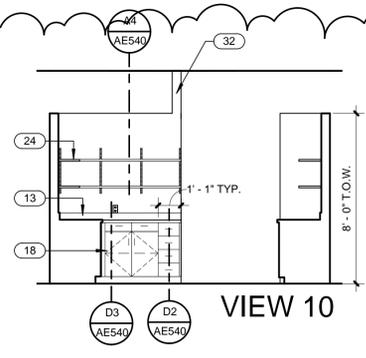
ARCHIVE 132
1/4" = 1'-0" B4 AE402



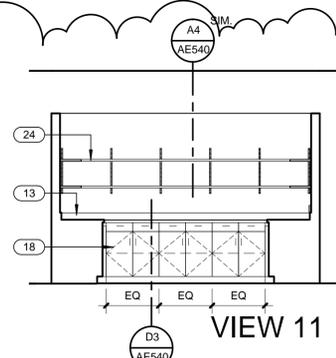
LOCKER ROOMS 127 AND 128
1/4" = 1'-0" C4 AE402



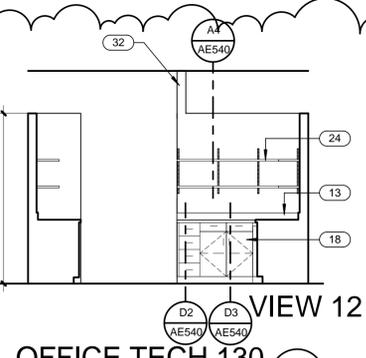
VIEW 9



VIEW 10

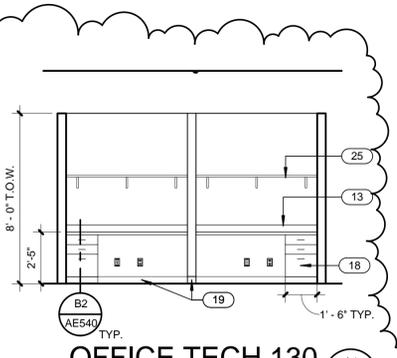


VIEW 11



VIEW 12

OFFICE TECH 130
1/4" = 1'-0" A3 AE402



OFFICE TECH 130
1/4" = 1'-0" A4 AE402

GENERAL NOTES

- GENERAL CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND SHALL REPORT TO THE ARCHITECT ANY UNKNOWN CONDITIONS, ERRORS OR CONFLICTS IN THE DRAWINGS BEFORE BEGINNING WORK.
- DO NOT SCALE DRAWINGS.
- ITEMS SHOWN BY HIDDEN LINE ARE SPECIFIED BY OTHER SECTIONS.

ALL WALLS TO BE TYPE "A" U.N.O. ON PLAN A

FIRE EXTINGUISHER FE

KEYED NOTES

- HAND SANITIZER DISPENSER. SEE ACCESSORY SCHEDULE.
- SOAP DISPENSER. SEE ACCESSORY SCHEDULE.
- CASEWORK. SEE IF DRAWINGS.
- URINAL PARTITION. SEE SPECS.
- FLOOR DRAIN. SLOPE FLOOR TO DRAIN AS SHOWN. SEE PLUMBING DRAWINGS.
- TOILET PAPER DISPENSER. SEE ACCESSORY SCHEDULE.
- 36" GRAB BAR. SEE ACCESSORY SCHEDULE.
- 42" GRAB BAR. SEE ACCESSORY SCHEDULE.
- 18" VERTICAL GRAB BAR. SEE ACCESSORY SCHEDULE.
- TOILET PARTITION. SEE SPECS.
- SANITARY NAPKIN DISPOSAL. SEE ACCESSORY SCHEDULE.
- MIRROR. SEE ACCESSORY SCHEDULE.
- COUNTERTOP WITH INTEGRAL 4" HIGH BACKSPASH. SEE CASEWORK DETAILS.
- SHOWER FIXTURE. SEE SHOWER MOUNTING HEIGHTS ON SHEET AE004.
- LOCKERS. SEE ACCESSORY SCHEDULE.
- SHOWER PARTITION. SEE SPEC AND FINISH SCHEDULE.
- UPPER CABINET. SEE INTERIOR ELEVATIONS.
- BASE CABINET. SEE CASEWORK DETAILS.
- BASE. SEE FINISH PLANS.
- CUBBIES. SEE INTERIOR ELEVATIONS.
- LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
- WHITEBOARD. SEE ACCESSORY SCHEDULE.
- SHOWER CURTAIN ROD. SEE ACCESSORY SCHEDULE.
- ADJUSTABLE SHELVING. SEE A3/AE540.
- SINGLE SHELF.
- INTEGRAL COVE BASE.
- 5/8" GYP. BD. PAINT.
- PROVIDE 3-5/8" 20 GA. @ 12" O.C. METAL STUDS ALONG THIS WALL.
- ADA SHOWER BENCH. SEE SHOWER MOUNTING HEIGHTS ON SHEET AE004.
- FOLDING SEAT. SEE ACCESSORY SCHEDULE.
- CLEAR AREA.
- PROVIDE POST AT WALL END. EXTEND TO STRUCTURE FOR BRACING. WRAP WITH GYP. BD. FINISH TO MATCH WALL FINISH.



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



MEHROOD SAMEH
04.28.2014
ARCHITECT-ENGINEER STAMP

Unified State
Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

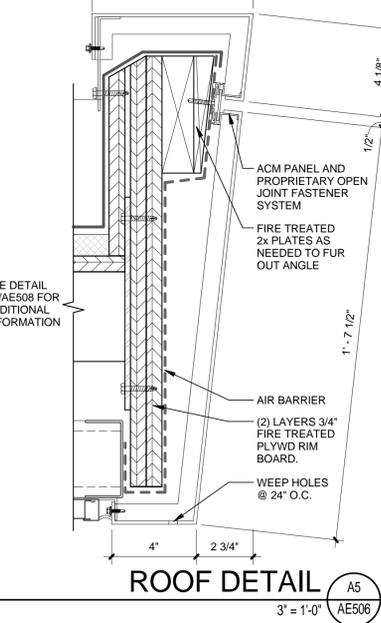
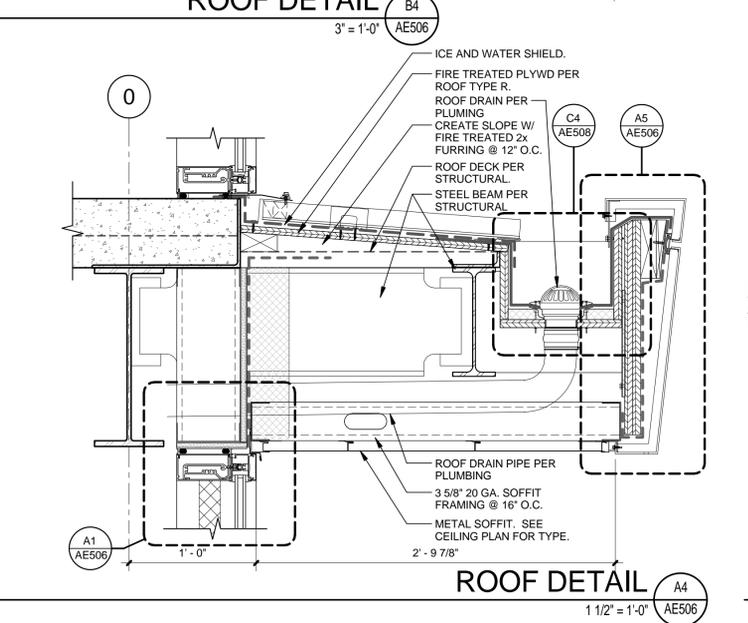
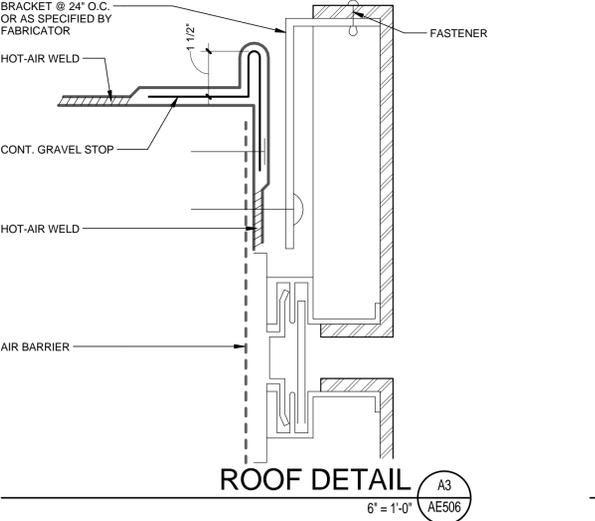
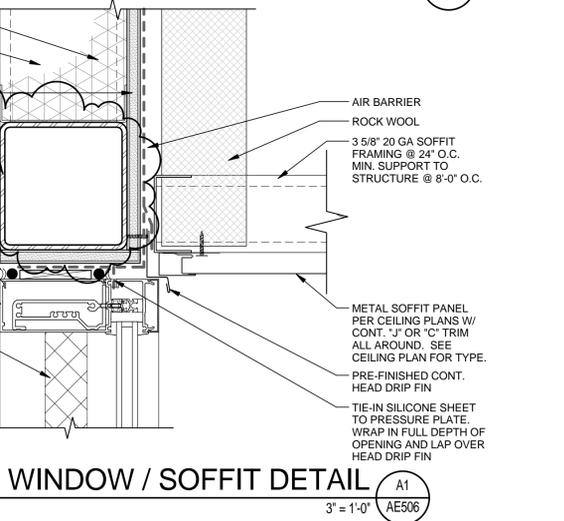
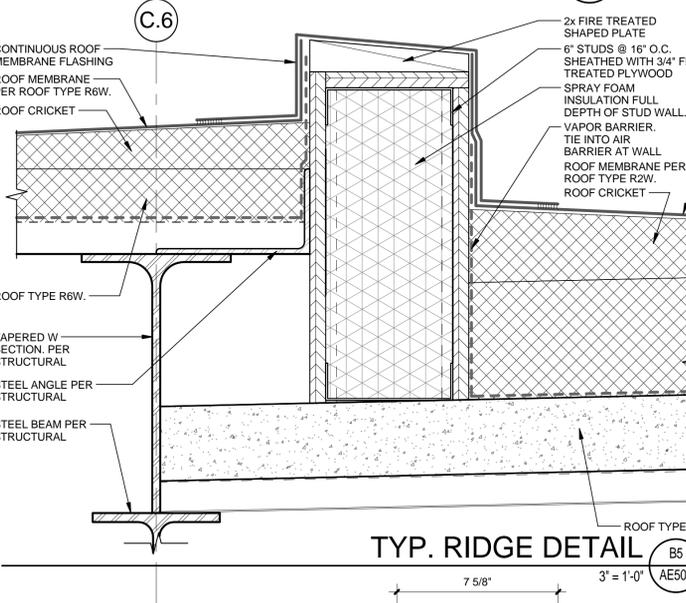
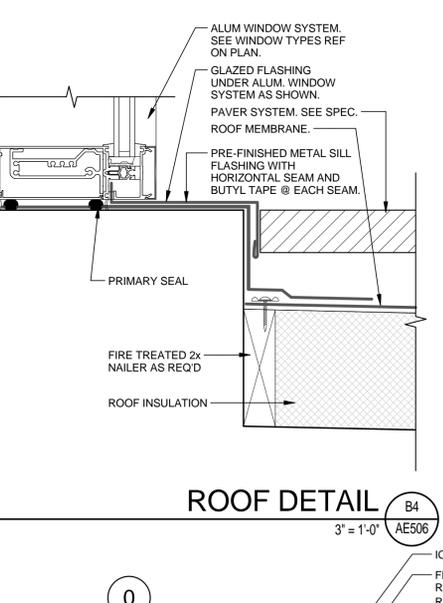
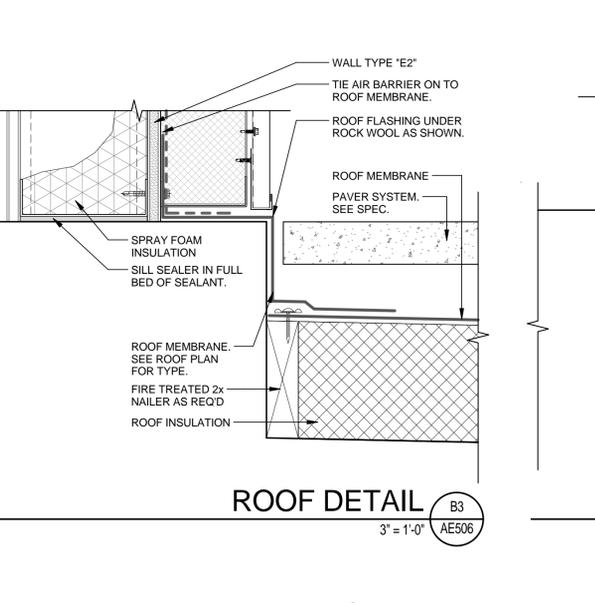
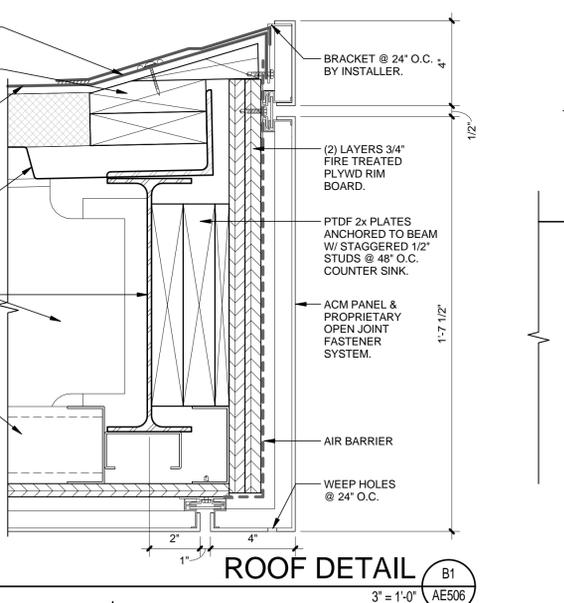
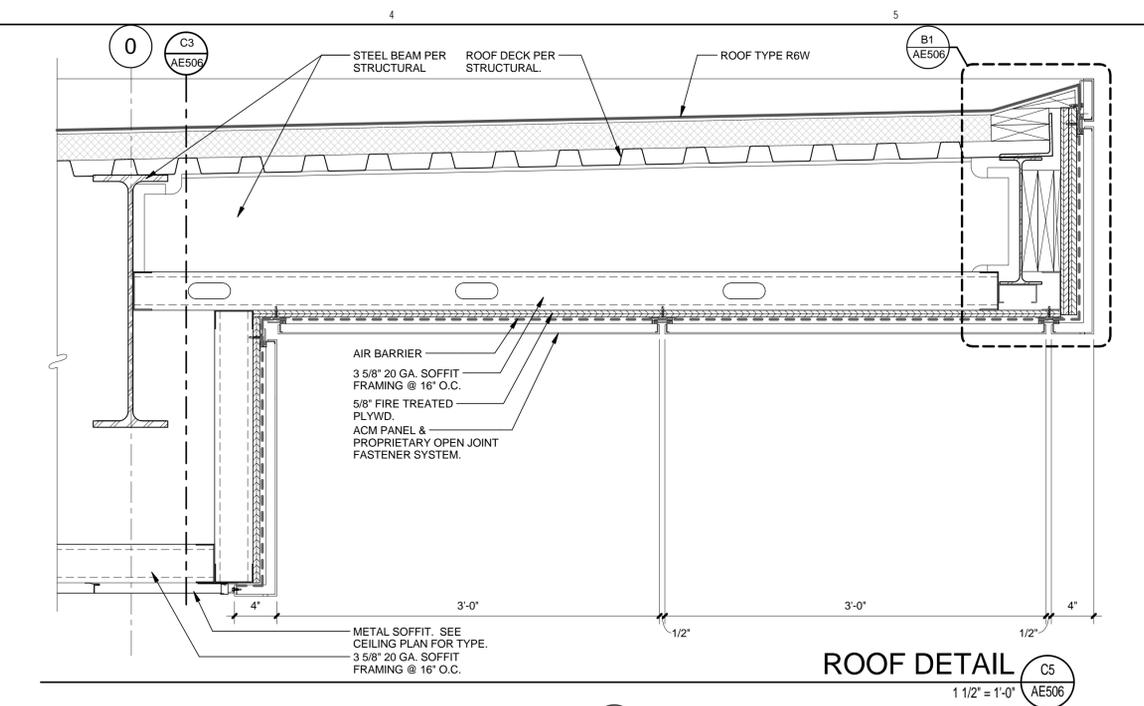
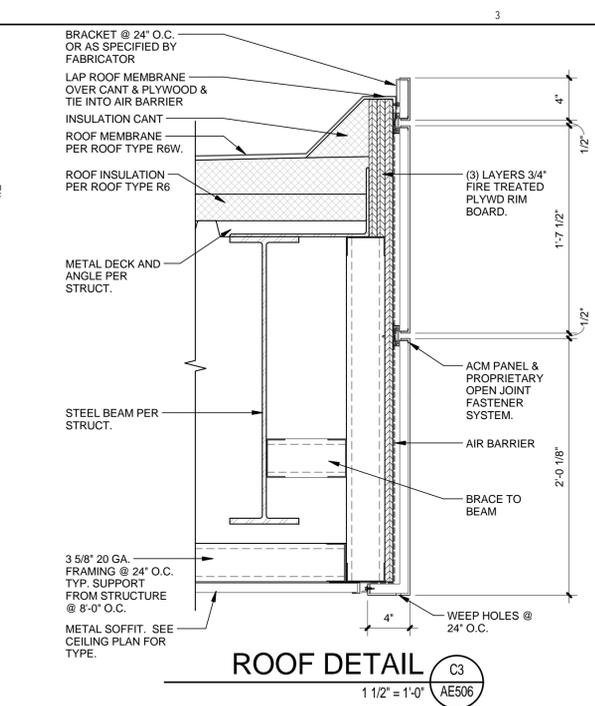
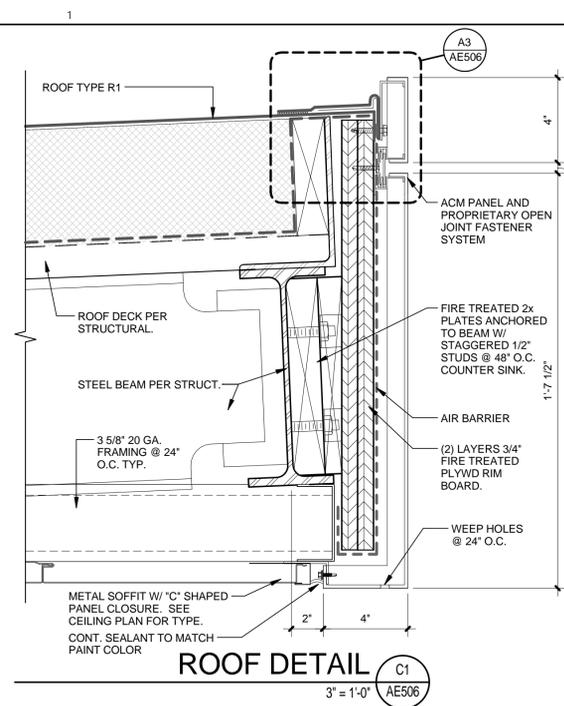
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

ENLARGED FLOOR
PLANS & INTERIOR
ELEVATIONS

AE402
VOLUME 1



CRSA

649 E. South Temple
Salt Lake City, UT 84102
801.355.5915

MWL

11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



Unified State
Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

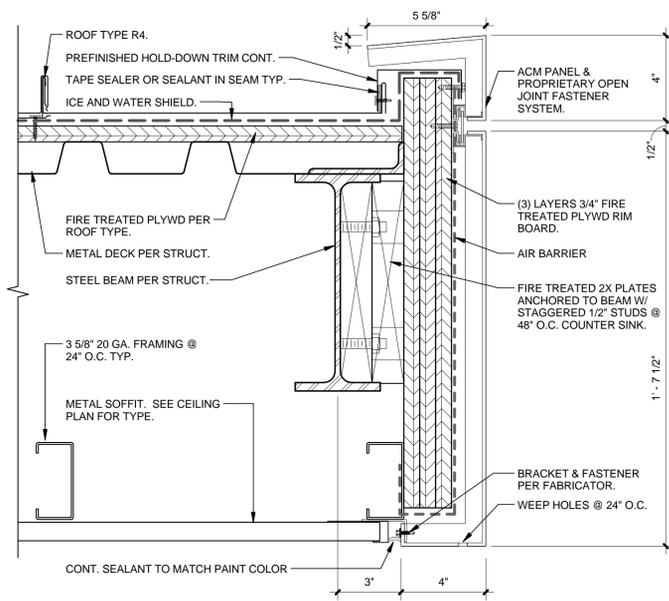
Project #: B13-024

DATE: APRIL 21, 2014
ISSUE TYPE: BID SET
MAY 15, 2015
ADD # 2

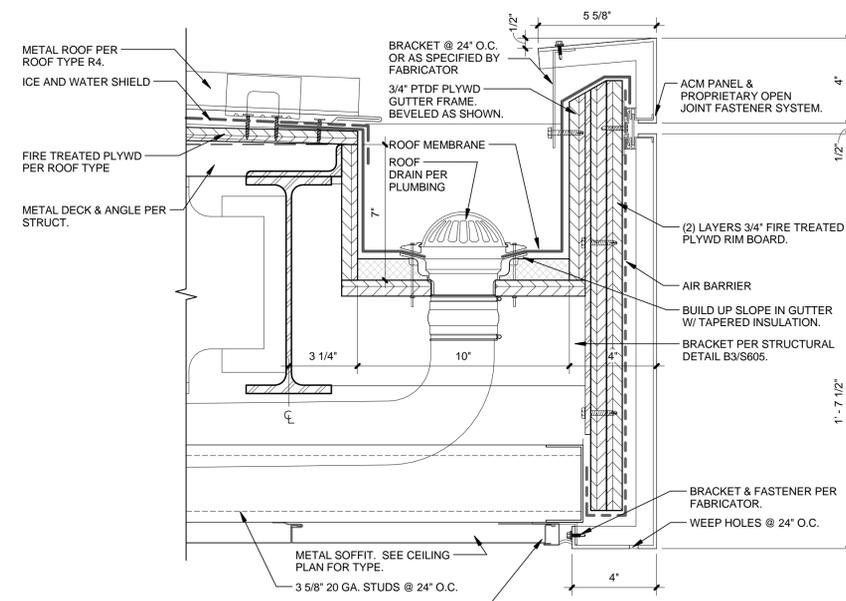
CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

DETAILS

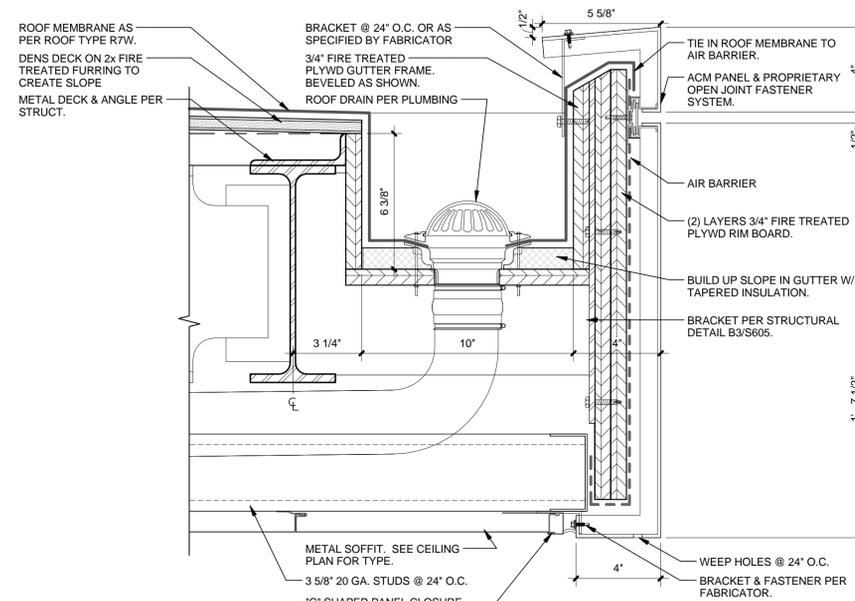
AE506
VOLUME 1



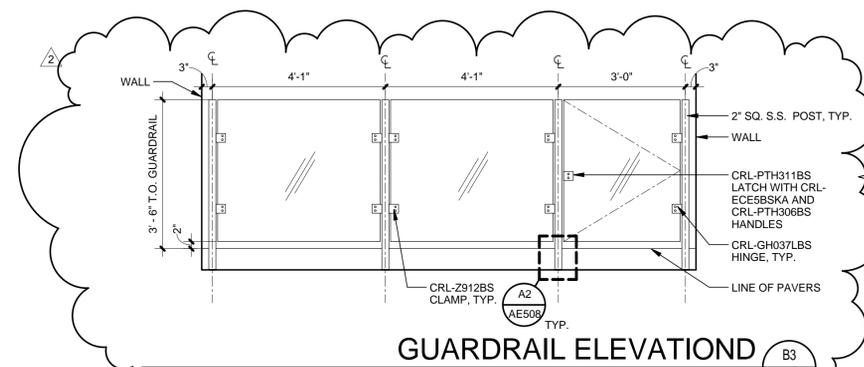
ROOF DETAIL B2
3' = 1'-0" AE508



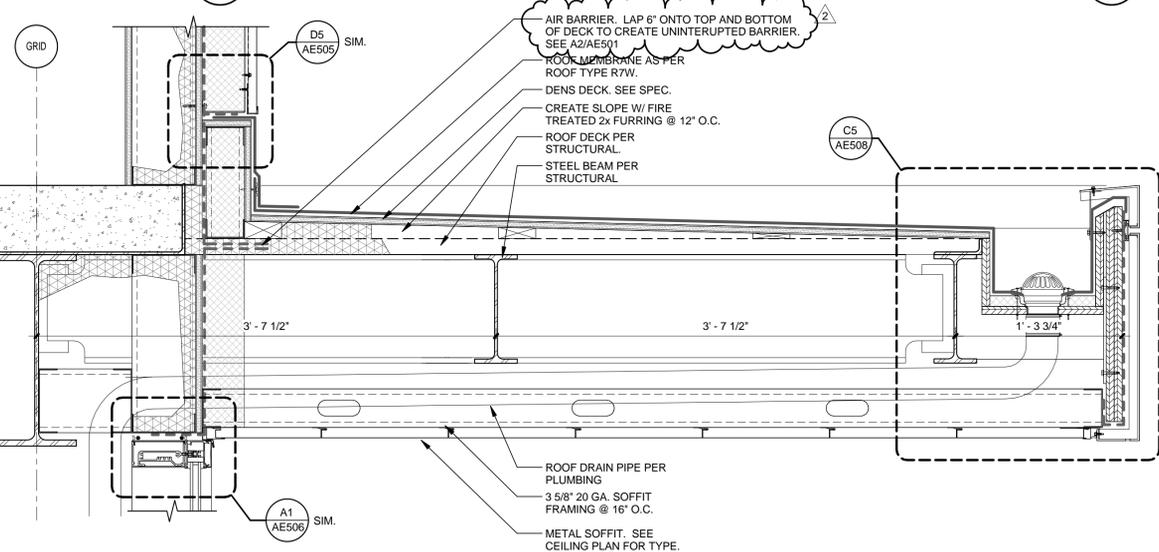
ROOF DETAIL C4
3' = 1'-0" AE508



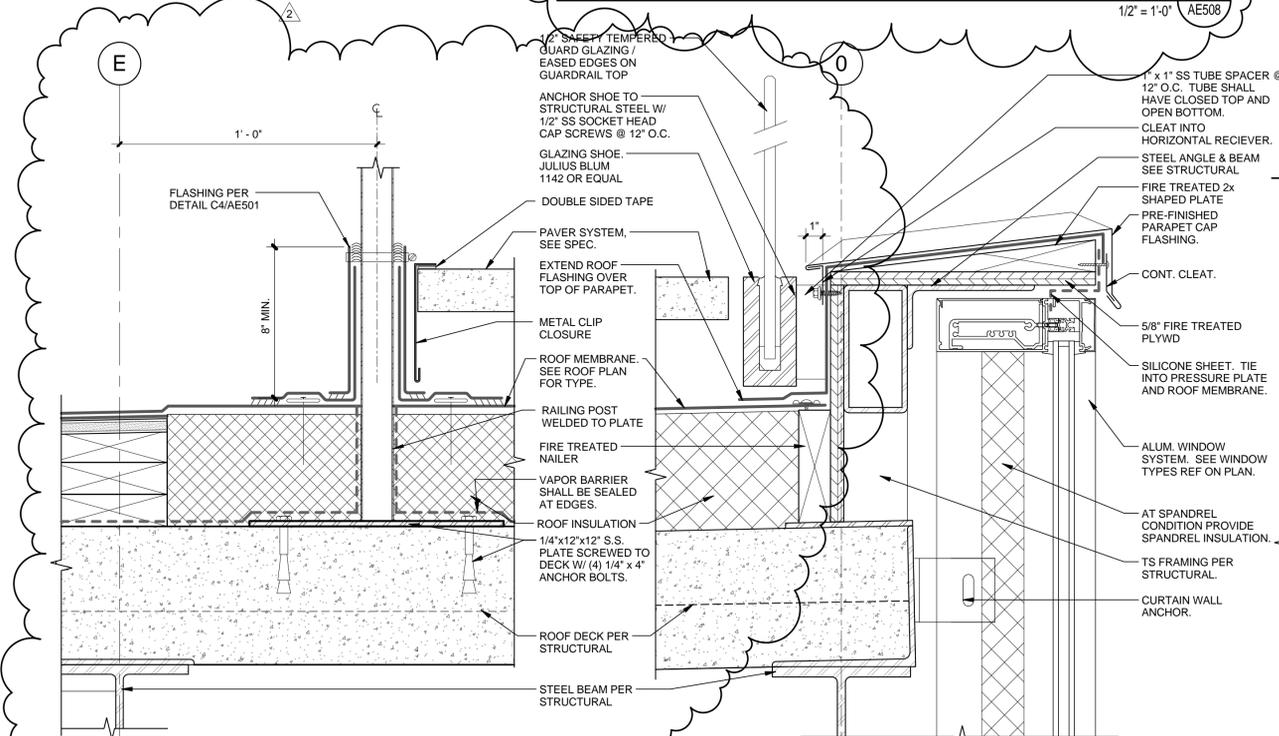
ROOF DETAIL C5
3' = 1'-0" AE508



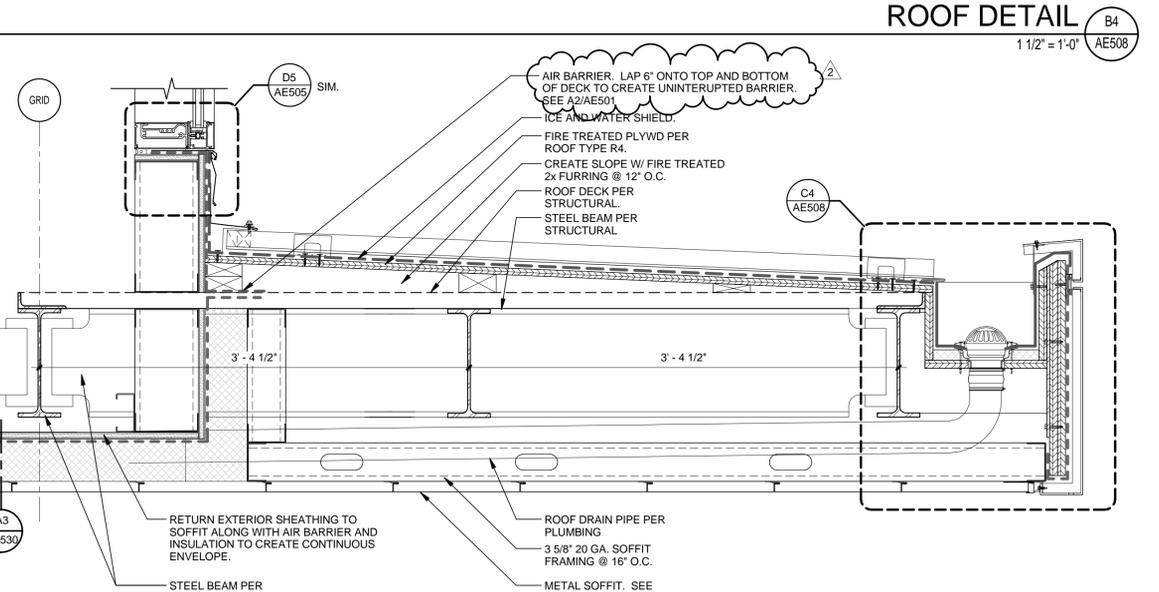
GUARDRAIL ELEVATION B3
1/2\"/>



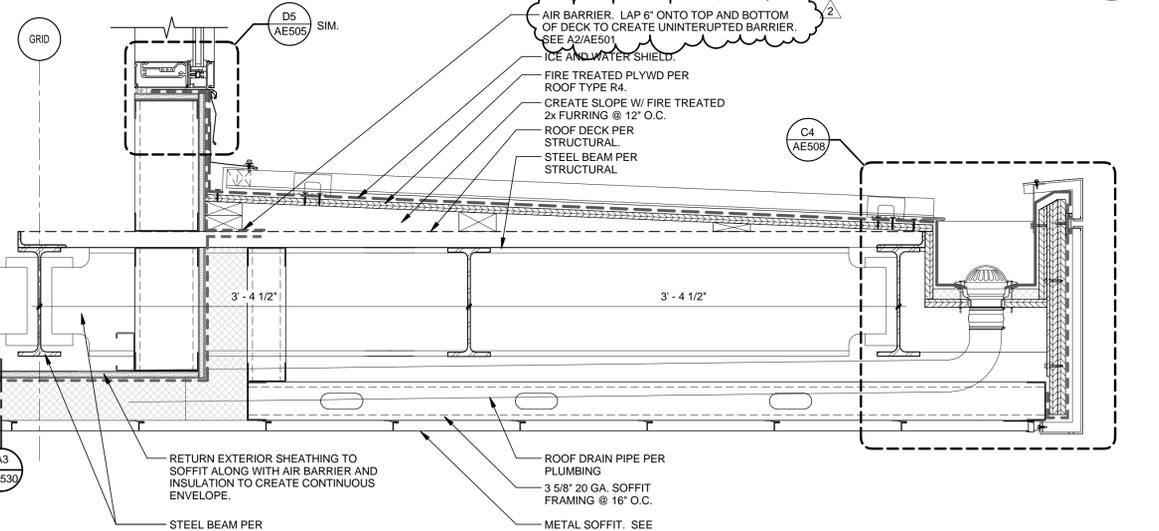
ROOF DETAIL B4
1 1/2\"/>



ROOF DETAIL A2
3' = 1'-0" AE508



ROOF DETAIL A3
1 1/2\"/>



ROOF DETAIL A4
1 1/2\"/>



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



04.28.2014
ARCHITECT-ENGINEER STAMP

Unified State Laboratory Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

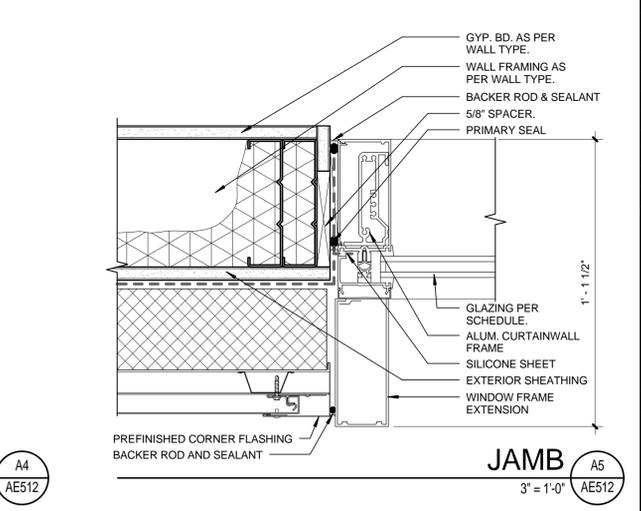
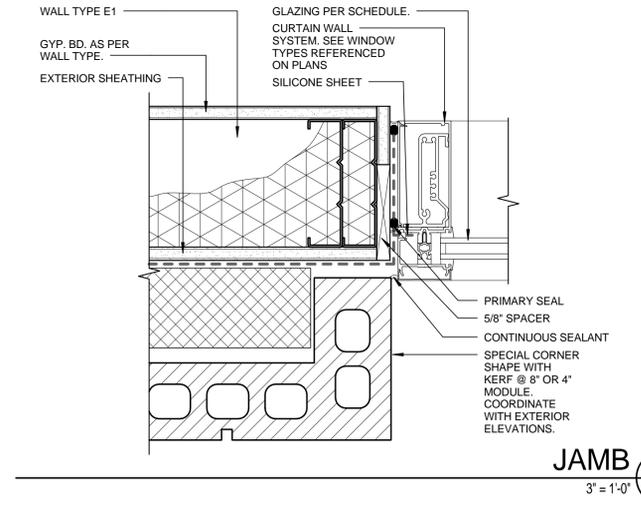
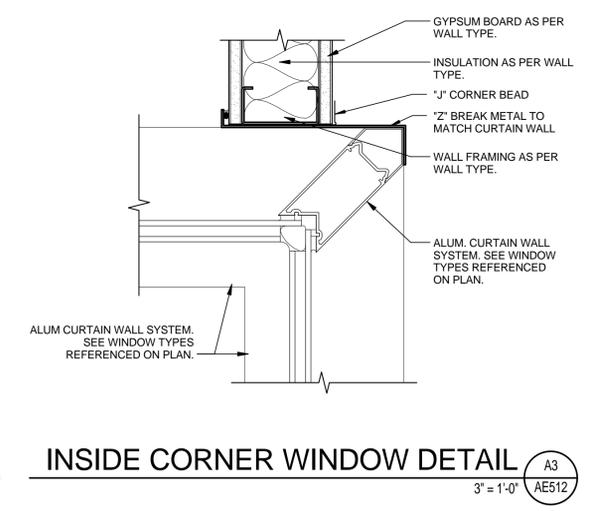
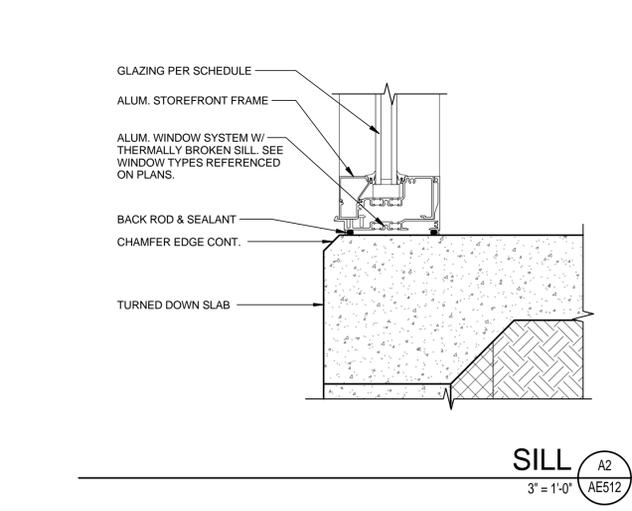
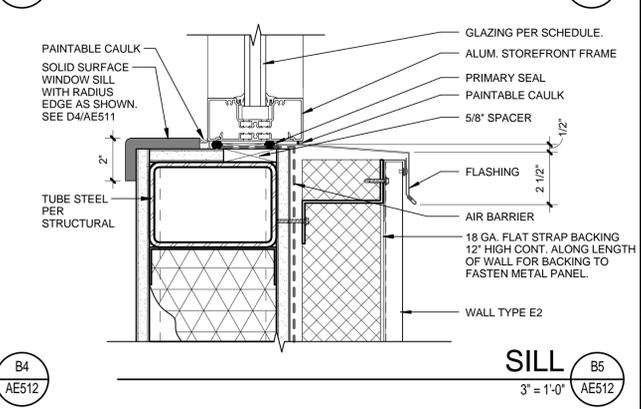
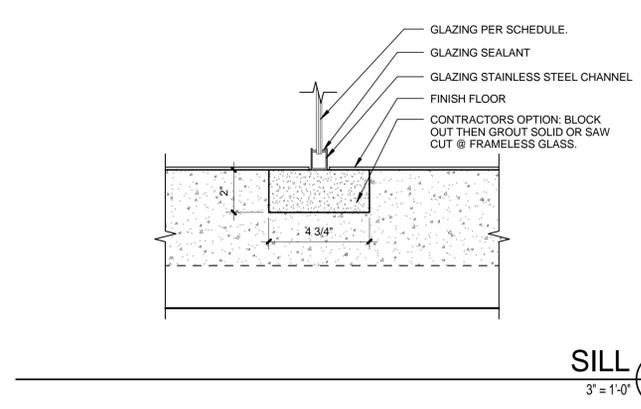
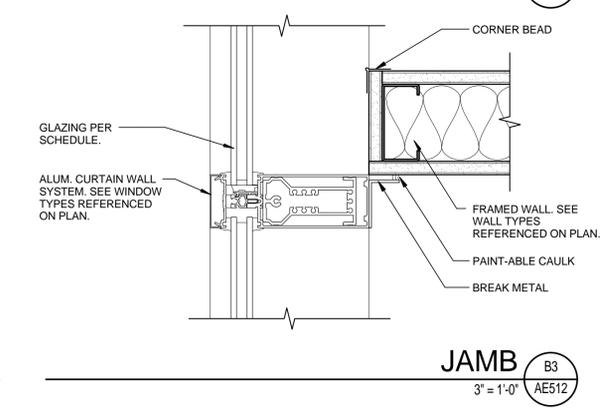
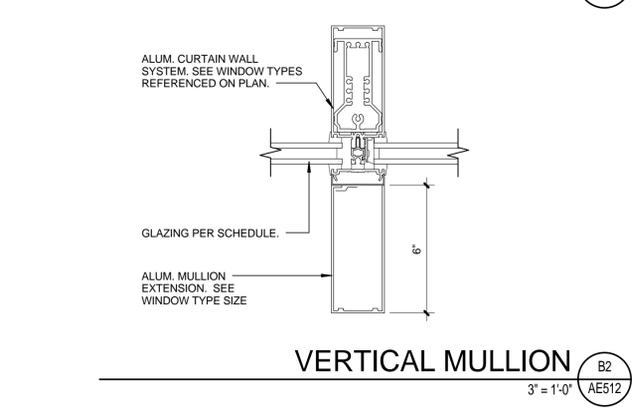
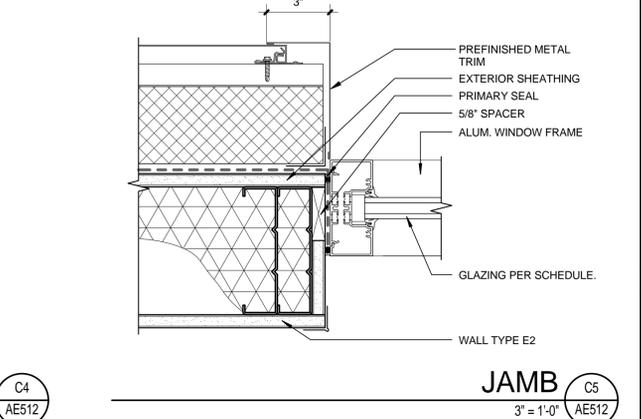
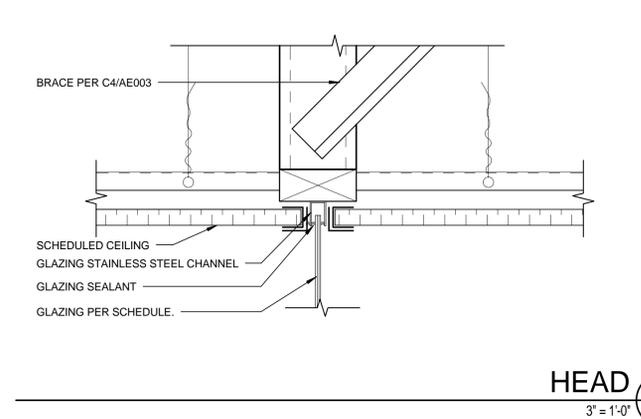
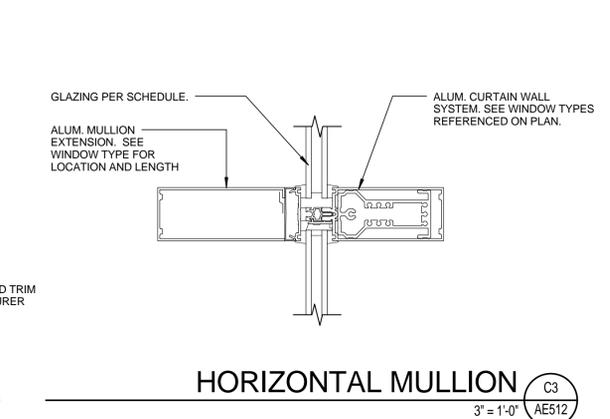
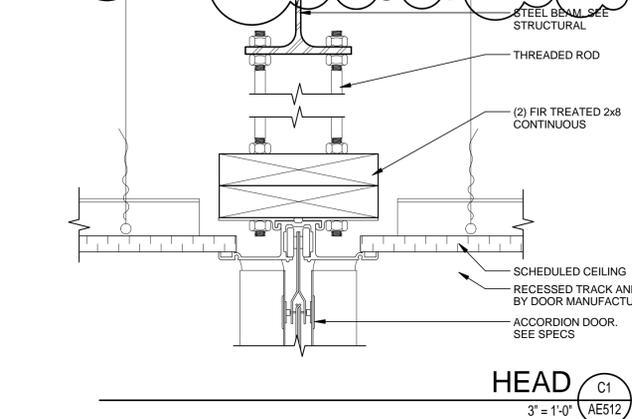
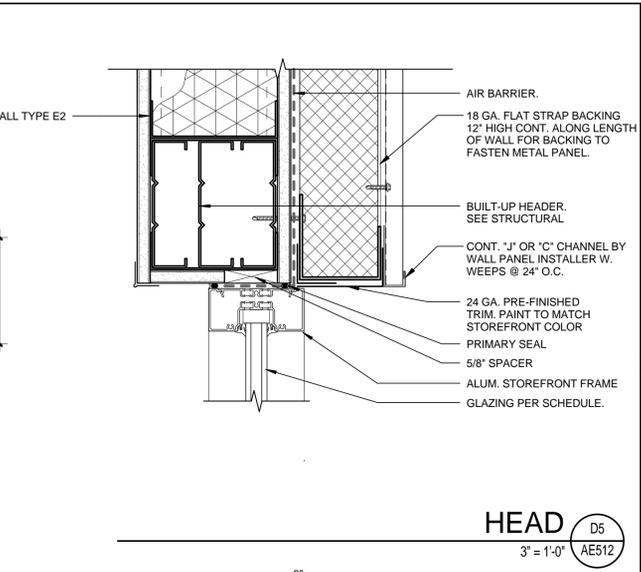
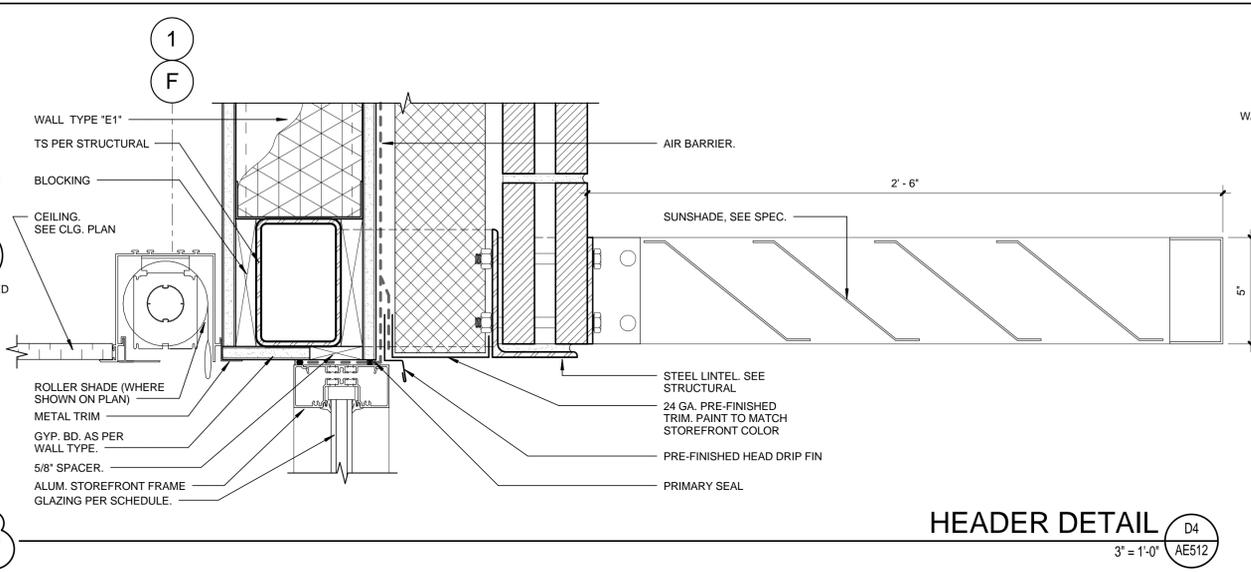
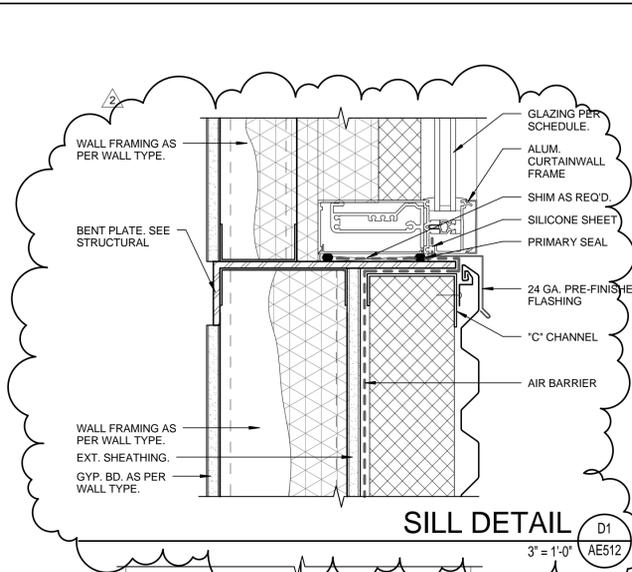
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

DETAILS

AE508
VOLUME 1



CRSA
 649 E. South Temple
 Salt Lake City, UT 84102
 801.355.5915

MWL
 11798 N. Lakeridge Pkwy.
 Ashland, VA 23005
 804-228-7473

State of Utah
 Department of Administrative Services

Division of Facilities
 Construction & Management
 4110 State Office Building
 Salt Lake City, Utah 84114
 Phone: (801) 538 - 3018
 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

STATE OF UTAH
 #134036
 MEHRDAD SAMI
 LICENSED ARCHITECT

Mehrdad Sami
 04.28.2014
 ARCHITECT-ENGINEER STAMP

**Unified State
 Laboratory
 Module 2**
 4451 South 2700 West,
 Taylorsville, UT 84118

DFCM #: 13020300

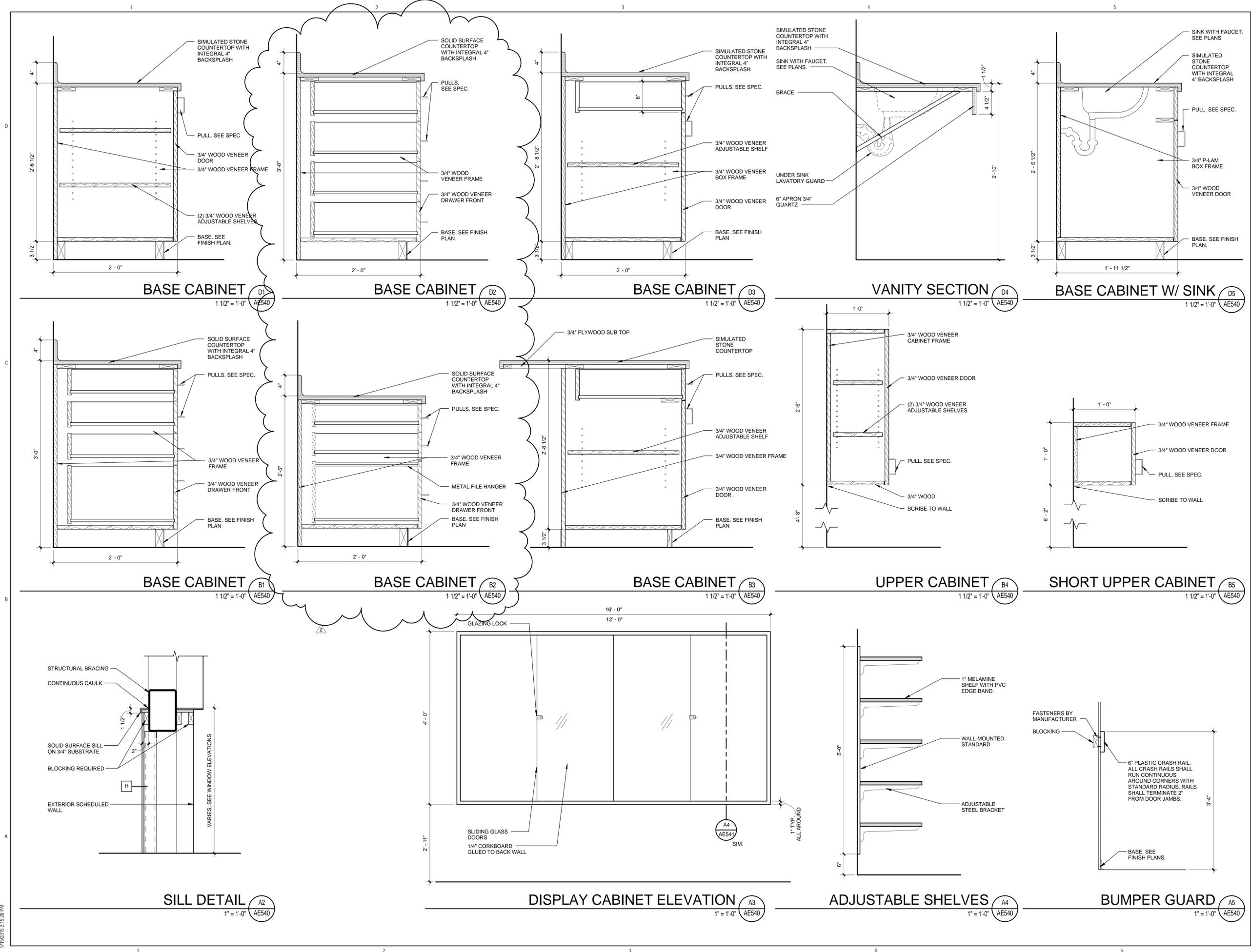
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2
CHECKED BY:	J. NIELSEN
DRAWN BY:	F. PITORE

DETAILS

AE512
 VOLUME 1

C:\Users\ferando\Documents_A_13024_ModB_2013_ferando.rvt
 5/15/2015 2:15:17 PM



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

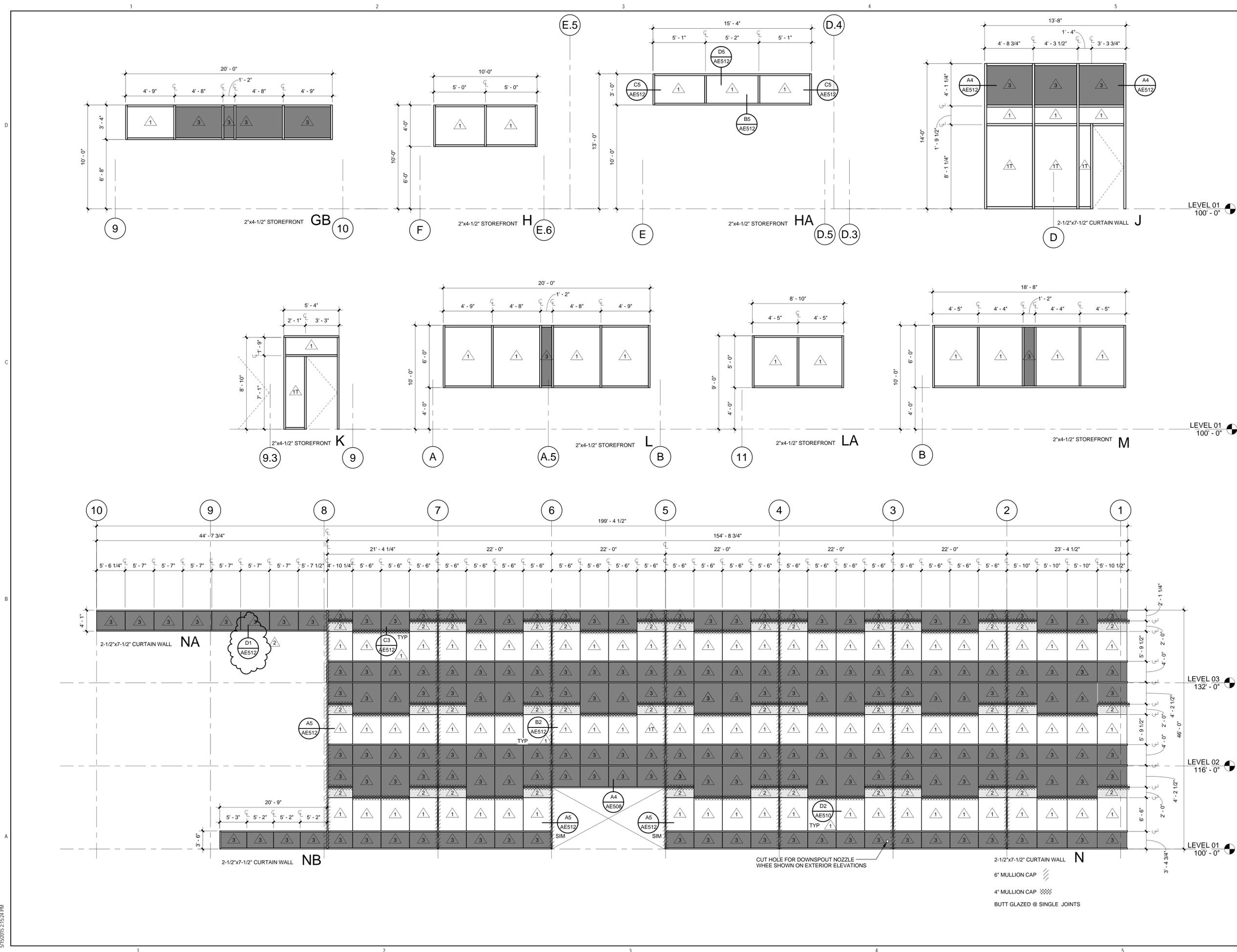
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

DETAILS

AE540
VOLUME 1



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



Mehرداد Samei
04.28.2014
ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

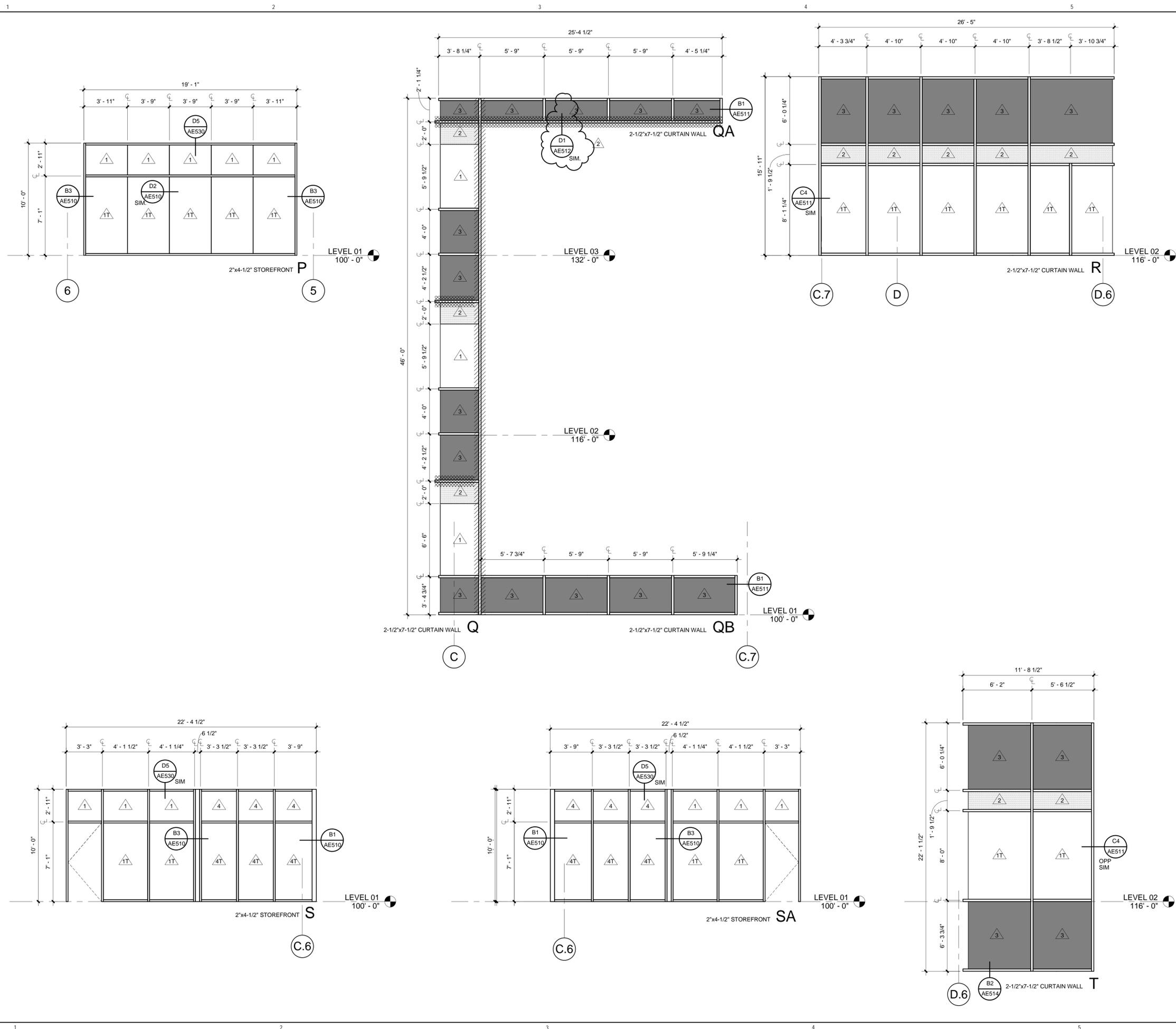
Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY: J. NIELSEN
DRAWN BY: F. PITORE

WINDOW TYPES

AE604
VOLUME 1



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



Mehrdad Same
04.28.2014
ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE:	ISSUE TYPE:
APRIL 21, 2014	BID SET
MAY 15, 2015	ADD # 2

CHECKED BY:	J. NIELSEN
DRAWN BY:	F. PITORE

WINDOW TYPES

AE605
VOLUME 1

ACCESSORY SCHEDULE (BASIS OF DESIGN)

Table with columns: ITEM, MAKE / MODEL, OPOI, OPCI, CPCI, ROOM. Includes items like BENCH, CUBICLE CURTAIN, FOLDING SHOWER SEAT, GRAB BAR, MIRROR, MOP RACK, PAPER TOWEL DISPENSER, ROBE HOOK, ROLLER SHADES, SANITARY NAPKIN DISPENSER, SHOWER CURTAIN, SOAP DISH, TOWEL SHELF, WHITEBOARD, etc.

GENERAL NOTES

SEE IL SHEETS AND SPEC SECTION 11 600 FOR ACCESSORIES IN LABORATORY SPACES

EQUIPMENT SCHEDULE

Table with columns: ITEM, OPOI, OPCI, CPCI, ROOM. Includes REFRIGERATOR, MICROWAVE.

FINISH LEGEND

Table with columns: ITEM, PRODUCT, SPECIFICATION (BASIS OF DESIGN), NOTES. Includes sections for WALLS, FLOORS, BASE, CEILINGS, MISCELLANEOUS INTERIOR FINISHES, and EXTERIOR FINISHES.



649 E. South Temple Salt Lake City, UT 84102 801.355.5915



11798 N. Lakeridge Pkwy. Ashland, VA 23005 804-228-7473

State of Utah Department of Administrative Services

Division of Facilities Construction & Management 4110 State Office Building Salt Lake City, Utah 84114 Phone: (801) 538 - 3018 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



04.28.2014 ARCHITECT-ENGINEER STAMP

Unified State Laboratory Module 2 4451 South 2700 West, Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

Table with columns: DATE, ISSUE TYPE. Includes APRIL 21, 2014 BID SET, MAY 15, 2015 ADD # 2.

CHECKED BY: J. Nielsen DRAWN BY: F. PITORE

FINISH LEGEND & ACCESSORY SCHEDULE

AE610 VOLUME 1



ADDENDUM #2

DATE: May 15, 2015

**PROJECT
NO:** 13245

PROJECT: Unified State Laboratory Module 2

DIVISION – 22 & 23

GENERAL

1. All VFDs shall be provided by division 22 & 23 but shall follow the VFD specifications in division 26.
2. Both CH-1 and CH-2 chillers will be allowed to follow either of the water cooled chiller specifications as long as the chiller performance is similar to that shown on the schedules. See specification section 236417 Centrifugal Magnetic Bearing Water Chillers, or spec section 236426 Rotary-Screw Water Chillers. See also modifications to section 236417 below.

DRAWINGS

SHEET - MH101B

1. Revise exhaust duct routing connected to HEV-B1-1 in Histology Lab 124D to match revised fume hood location.

SHEET - ME606

1. Revised keyed notes for the Air Handler Schedule regarding single point power. See Air Handler schedule

SHEET - ME609

1. Revised keyed notes for the Fan Schedule. Made them readable and added note about VFDs. See Fan schedule

SHEET - ME611

1. Revise airflow performance of exhaust hood EH-2. See exhaust hood schedule.

SHEET - ME612

1. Revised voltage of Pumps P-22 & 23. See Pump schedule.

SHEET - PE103A

1. Pesticide Formulation Instrument Lab-301B and Pesticide Residue Instrument Lab-301C: Add P5-1 outlets and P5 piping serving these labs. Add Keyed Note indicator to SP tanks in grid 3 tank storage closet.
2. Change SP piping in corridor to originate from tanks in closet near grid 6. Add Keyed Note indicator to SP tanks grid 6 tank storage closet.
3. Add ES water supply piping to ESEW-1 in Wet Chem 314.
4. Add SP piping and SP-1 outlet in Wet Chem 314.

SHEET - PW101C

1. Add waste and vent connection and keyed note to eyewash portion of emergency wash station in VEB 2-113.

SHEET - PW102A

1. Add waste and vent connection and keyed note to eyewash portion of emergency wash station in Extraction-215.

SHEET - PW102B

1. Add waste and vent connection and keyed note to eyewash portion of emergency wash station in Chemistry Trace-211.

SHEET - PW102C

1. Add waste and vent connection and keyed note to eyewash portion of emergency wash station in

SHEET - PW103A

1. Add waste and vent connection and keyed note to eyewash portion of emergency wash stations in Pesticide Formulation Extraction Lab-301A, Pesticide Residue Instrument Lab-301C and Wet Chem-314

SPECIFICATIONS

SECTION – 220700 Plumbing Insulation:

- 1 Section 3.12 paragraph B line 4: add Reagent Grade (RO/DI) water as not being insulated.
- 2 Section 3.13 paragraph A: Include Industrial Cold Water and Soft Cold Water as being insulated under this heading.
- 3 Section 3.13 paragraph B: Include Industrial Hot Water, Recirculated Industrial hot water and Emergency shower tempered water supply and return as being insulated under this heading.

SECTION – 23649 Centrifugal Magentic Bearing Water Chillers:

- 1 Revised chiller spec in several locations. See the attached revised spec with strike outs and added text in Red.

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.

<u>Item</u>	<u>Manufacturer</u>	<u>Comments</u>
Faucets	American Standard	Not Approved
Showers	American Standard	Not Approved
Toilet Seats	American Standard	Approved
Hydronic Boiler	Lochinvar	Approved
Gas-fired Water Heater	Lochinvar	Approved
Air-Cooled Chiller	Dunham-Bush	Approved
Cooling Tower	Tower Tech	Not Approved
Air Separator	Flo Fab	Approved
Expansion Tank	Flo Fab	Approved
Hydronic-to-Hydronic Heat Exchanger	Flo Fab	Approved
Pump Suction Diffusers	Flo Fab	Approved
Triple Duty Valves	Flo Fab	Approved
Pressure Gauges	Flo Fab	Approved
Thermometers	Flo Fab	Approved
Airtrol Fittings	Flo Fab	Approved
Flex Connectors	Flo Fab	Approved
Y-Strainers	Flo Fab	Approved
Manual Air Vents	Flo Fab	Approved
Auto Air Vents	Flo Fab	Approved
Gauge Cocks	Flo Fab	Approved
Venturi	Flo Fab	Approved
Balancing Valves	Flo Fab	Approved

Rotary Screw Chiller	York YMC2 Magnetic Centrifugal Chiller	Approved
Custom Air Handling Unit	York/Pace Custom	Approved
Custom Air Handling Unit	Alliance Air Products Custom	Approved
Refrigerant Monitor	Genesis International	Approved
Scroll Water Chiller	York YCAL Air Cooled Scroll	Approved
Expansion loops and joints	Twin City Hose	Approved
Expansion loops and joints	Mason Industries	Approved
Strainers	IFC	Approved
Check Valves	IFC	Approved
Balancing Valves	Danfoss	Approved
Balancing Valves	Gerand Engineering	Approved
Instantaneous Heat Exchangers	Cemline	Approved
Instantaneous Heat Exchangers	Alfa Laval	Approved
Domestic wet rotor pumps	Grundfos	Approved
Pumps	PACO Pumps	Approved
Tangential Air Separators	American Wheatley	Approved
Plate & Frame Heat Exchangers	Alfa Laval	Approved
Cabinet Unit Heaters	Airtherm	Approved
Sump Pump	Weil Pump	Approved
Sump Pump	Grundfos	Approved
Radiant Ceiling Panel	Vulcan Radiator	Approved
Chilled Water Buffer Tank	Cemline	Approved
Vertical Turbine Pumps	Tru2o	Approved
Fan Coil Units	Stulz CeilAir	Approved
Backdraft Dampers	United Enertech	Approved
Pressure Relief Dampers	United Enertech	Approved
Barometric Relief Dampers	United Enertech	Approved
Manual Volume Dampers	United Enertech	Approved
Control Dampers	United Enertech	Approved
Fire Dampers	United Enertech	Approved
Smoke Dampers	United Enertech	Approved
Combination Fire/Smoke Dampers	United Enertech	Approved
Duct Silencers	Pottorff	Approved
Duct Mounted Access Doors	United Enertech	Approved
Remote Damper Operators	United Enertech	Approved
Flexible Ducts	JP Lamborn	Approved
Duct Security Bars	Tuttle & Bailey	Approved
Fixed, Extruded-Aluminum Louvers	United Enertech	Approved
Expansion Fittings	Twin City Hose	Approved
Thermometers and Gages	Weksler	Approved
Vertical Turbine Pumps	American Turbine	Approved
Flexible Ducts	Thermafex	Approved
Duct Security Bars	Krueger	Approved
Condensing Boilers	Thermal Solutions	Not Approved
Scroll Water Chillers	Aaon	Approved
Scroll Water Chillers	Quantech	Not Approved
Refrigerant Monitor	MSA	Approved
Cooling Towers	American Cooling Tower	Approved
Iron and Bronze Check Valve(Plumbing)	Keckley	Approved
Domestic Water Heat Exchangers	Bell & Gossett	Approved
Compression Tanks	Bell & Gossett	Approved
Condensing Boilers	Camus Advantus	Not Approved
Frequency Drives	Eaton Cutler Hammer	Not Approved
Holding Storage Tank	Niles	Approved

Centrifugal Chiller	Trane CVHS Oil Free Centrifugal Chiller	Not Approved
Rotary Screw Chiller	Trane Optimus	Approved
Custom Air Handling Units	Haakon	Approved
Laboratory Exhaust	Twin City	Approved
Gravity Ventilators	Air-Rite	Approved
Breechings, Chimney & Stacks	Metal-Fab	Approved
Dust Collectors	American Air Filter	Approved
Exhaust Hoods	Kees	Approved
Exhaust Hoods	Econ Aire	Approved
Snorkel Exhaust	Car-Mon	Approved
Duct Free A/C Unit	LG	Approved
Fan Wall Custom AHU	Unitech	Approved
Fan Coils	Magic Air	Approved
Fan Coils	IEC	Approved
Refrigerant Monitor	Sherlock	Approved
Control Dampers	Greenheck	Approved
Duct Silencers	Commercial Acoustics	Approved
Louvers	Greenheck	Approved
Listed Special Gas Vents	Van Packer	Approved
Listed Special Gas Vents	Protech Systems	Approved
Screw Chillers	Daikin Applied	Approved
Refrigerant Monitors	Sentech	Approved
Steam Humidifiers	Neptronic	Not Approved
Fan Coil Units	Williams	Approved
Propeller Unit Heaters	Beacon Morris	Approved
Propeller Unit Heaters	Sigma	Approved
Cabinet Unit Heaters	Beacon Morris	Approved
Cabinet Unit Heaters	Sigma	Approved
Cabinet Unit Heaters	Daikin Applied	Approved
Radiant Ceiling Panels	Sigma	Approved
Dust Collectors	AQC	Approved
Snorkel Exhaust Units	AQC	Approved
Split Systems	Daikin	Approved
Vertical Turbine Pumps	Taco	Approved
Suction Diffusers	Taco	Approved
Variable Frequency Drives	Danfoss	Not Approved
Plate and Frame Heat Exchangers	Sondex	Approved
Radiant Ceiling Panels	Sterling	Approved
Unit Heaters	Sterling	Approved
Cabinet Unit Heaters	Sterling	Approved
Storage Tank	Wendland	Approved
Strainers	Titan	Approved
Check Valves	Titan	Approved

End Addendum

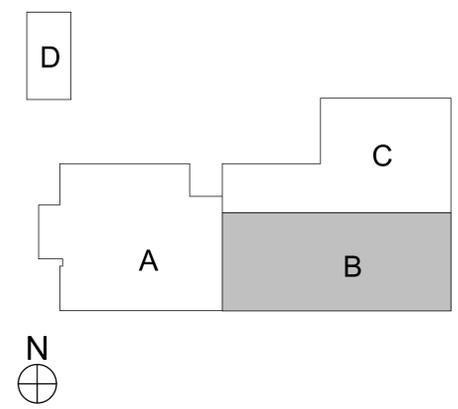
KEYED NOTES

- 1 DUCT TO RISE UP IN TRUSS SPACE AS SHOWN.
- 2 DROP DUCT DOWN TO WITHIN 1'-0" AFF. PROVIDE BALANCING DAMPER AND BALANCE TO AIRFLOW NOTED.
- 3 EXHAUST DUCT TO DROP DOWN IN WALL CHASE AND CONNECT TO (QTY. 7) SIDEWALL EXHAUST GRILLES ON AUTOPSY TABLE. BALANCE TO 240 CFM EACH. SEE AUTOPSY DISSECTION TABLE EXHAUST CONNECTION DETAIL.
- 4 DROP DUCT DOWN AND INSTALL LOW SIDEWALL EXHAUST GRILL AT 1'-0" AFF. BALANCE TO AIRFLOW NOTED.
- 5 24"x24" RETURN AIR GRILL (QTY. 2) WITH TRANSFER AIR DUCT FOR MAKEUP AIR. SIZE DUCT AS NOTED.
- 6 CONNECT EXHAUST DUCT TO FUME HOOD. INSTALL SASH STOP AT 18". BALANCE TO 100 FPM FACE VELOCITY AT 18" SASH HEIGHT. EXHAUST DUCT SHALL BE WELDED 304 STAINLESS STEEL FROM HOOD CONNECTION TO MEDIUM PRESSURE MAIN. APPROXIMATE AIRFLOW NOTED.

KEYED NOTES

- 7 CLOTHES DRYER EXHAUST DUCT. EACH VERTICAL RISER SHALL BE PROVIDED WITH A MEANS FOR CLEANOUT. DUCT SHALL NOT BE CONNECTED OR INSTALLED WITH SHEET METAL SCREWS OR OTHER FASTENERS THAT WILL OBSTRUCT EXHAUST FLOW. THE DUCT SHALL HAVE A SMOOTH INTERIOR FINISH WITH THE MALE END OF THE DUCT AT OVERLAPPED JOINTS EXTENDING IN THE DIRECTION OF AIRFLOW IN ACCORDANCE WITH 2012 IMC SECTION 504.6.2. PROVIDE DUCT SUPPORTS EVERY 4 FT.
- 8 PROVIDE DUCT STATIC PRESSURE SENSOR. SEE SEQUENCE OF OPERATIONS.
- 9 PROVIDE 8" DIA. EXHAUST DUCT AND DROP THROUGH CEILING IN LOCATION SHOWN FOR FUTURE EQUIPMENT CONNECTION. CAP DUCT AIR TIGHT AND PROVIDE BALANCING DAMPER AND ESCUTCHEON AT CEILING PENETRATION.
- 10 PROVIDE AND INSTALL AIRFLOW MEASURING STATION IN SALLYPORT EXHAUST DUCT. SEE SPECIFICATION 230994 FOR SEQUENCE OF OPERATIONS. INSTALL AIRFLOW MEASURING STATION TO MAINTAIN MANUFACTURERS REQUIRED LENGTHS OF STRAIGHT DUCT.
- 11 EXHAUST DUCT TO DROP DOWN IN WALL CHASE AND RUN BELOW GRADE TO CONNECT TO (QTY. 7) SIDEWALL EXHAUST GRILLES ON AUTOPSY TABLE. BALANCE TO 240 CFM EACH. SEE AUTOPSY DISSECTION TABLE EXHAUST CONNECTION (UNDERGROUND) DETAIL.

KEY PLAN



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

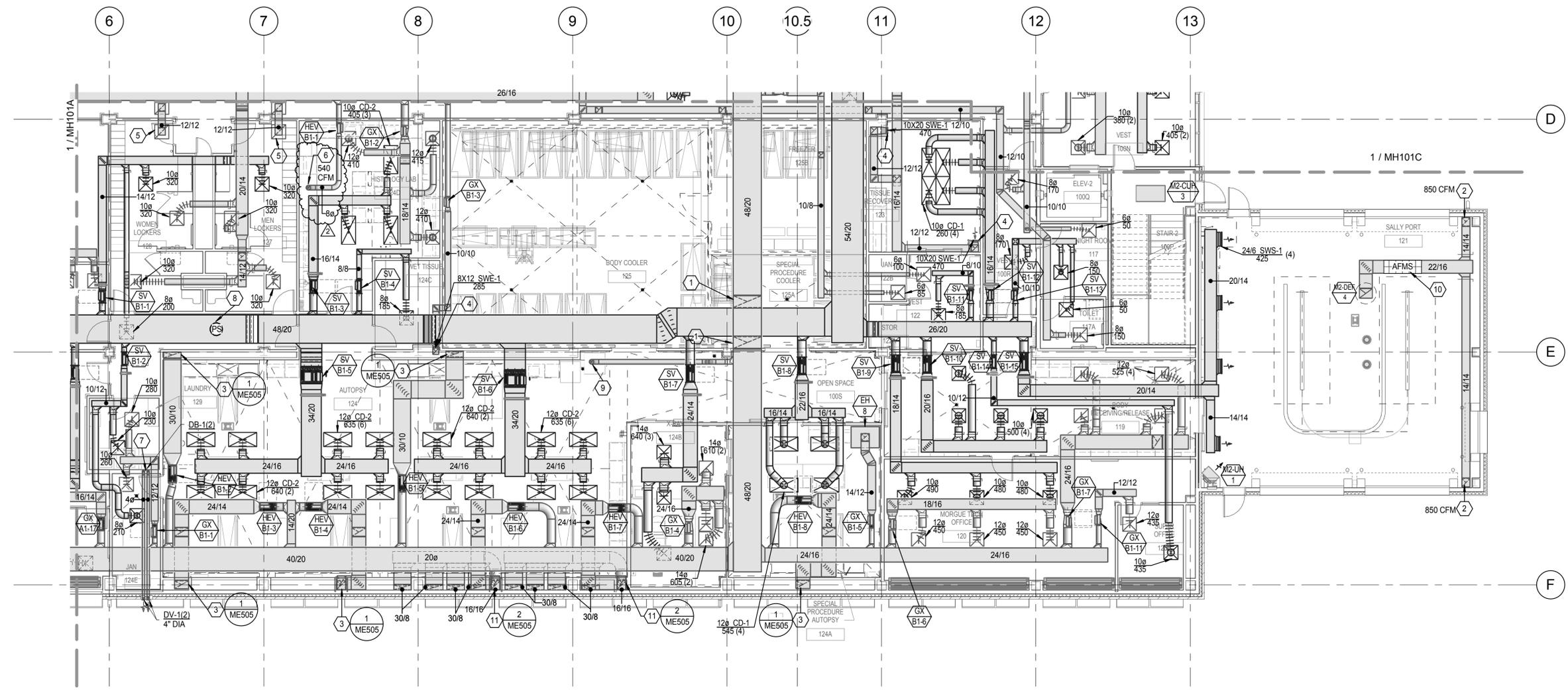
DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

CHECKED BY: S. Muir
DRAWN BY: DL

**LEVEL 1
MECHANICAL PLAN
AREA B**

MH101B

VOLUME 2



LEVEL 1 MECHANICAL PLAN AREA B
1/8" = 1'-0" MH101B

FAN COIL SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR COOLING COIL						ELECTRICAL		PHYSICAL		NOTES			
				AIR FLOW RATE (CFM)	SENSIBLE CAPACITY (MBH)	TOTAL CAPACITY (MBH)	ENTERING AIR TEMP (DB/WB)	LEAVING AIR TEMP (DB/WB)	FLUID FLOW RATE (GPM)	FLUID PRESSURE DROP (FT HD)	ENTERING/LEAVING FLUID TEMP (°F)	FLUID	VOLT/PH/HZ		FAN MOTOR (HP)	LENGTH/WIDTH/HEIGHT (IN)	OPERATING WEIGHT (LBS)
M2-FC-1	LIEBERT MINIMATE MMD40C	I.T. 100F	(2)	1250	26.3	27.6	75/58.7	52/49.8	9	19.6	45/51.4	WATER	460/3/60	1/2	54/30/24	230	1,2,3
M2-FC-2	LIEBERT MINIMATE MMD40C	I.T. 100G	(2)	1250	26.3	27.6	75/58.7	52/49.8	9	19.6	45/51.4	WATER	460/3/60	1/2	54/30/24	230	1,2,3
M2-FC-3	LIEBERT MINIMATE MMD40C	ELECTRICAL 100L	(2)	1250	26.3	27.6	75/58.7	52/49.8	9	19.6	45/51.4	WATER	460/3/60	1/2	54/30/24	230	1,2,3
M2-FC-4	LIEBERT MINIMATE MMD40C	ELECTRICAL 100M	(2)	1250	26.3	27.6	75/58.7	52/49.8	9	19.6	45/51.4	WATER	460/3/60	1/2	54/30/24	230	1,2,3
M2-FC-5	LIEBERT MINIMATE MMD40C	I.T. 200B	(2)	1250	26.3	27.6	75/58.7	52/49.8	9	19.6	45/51.4	WATER	460/3/60	1/2	54/30/24	230	1,2,3
M2-FC-6	LIEBERT MINIMATE MMD40C	I.T. 300D	(2)	1250	26.3	27.6	75/58.7	52/49.8	9	19.6	45/51.4	WATER	460/3/60	1/2	54/30/24	230	1,2,3
M2-FC-7	TRANE BCHC-072	CHILLER RM	(2)	2,400	61	--	80/62	56/53	10	5	42/56	WATER	460/3/60	2	--	--	1,2,4
M2-FC-8	TRANE BCHC-072	BOILER RM	(2)	2,400	61	--	80/62	56/53	10	5	42/56	WATER	460/3/60	2	--	--	1,2,4

- (1) CAPACITIES BASED AT 4,305 FEET ELEVATION.
- (2) HORIZONTAL EXPOSED CEILING MOUNT (PLENUM DISCHARGE).
- (3) COMPLETE WITH FACTORY MOUNTED DISCONNECT, HUMIDIFIER, AND MERV 8 INTERNAL FILTER.
- (4) COMPLETE WITH FACTORY MOUNTED DISCONNECT AND MERV 8 FILTER.

FAN SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR FAN				ELECTRICAL			PHYSICAL		NOTES	
					MAXIMUM AIRFLOW RATE (CFM)	STATIC PRESSURE (IN. H2O)	FAN SPEED (RPM)	FAN WHEEL DIAMETER (IN)	STATIC EFFICIENCY (%)	MOTOR SIZE (HP)	MOTOR BHP (HP)	MOTOR SPEED (RPM)	VOLT/PH/HZ		LENGTH/WIDTH/HEIGHT (IN)
M2-DOF-1	TWIN CITY	BOILER RM	ROOF FILTERED,CENTRIF	OUTSIDE AIR	4000	0.4	435	30	69.5	0.5	0.362	1800	120/1/60	52.5/44.88/71.82	
M2-DEF-1	TWIN CITY BCRD 085D	PENTHOUSE ROOF	ROOF DOWNBLAST, DOME	EXHAUST AIR	600	0.83	1948	10.5	57.9	0.33	0.136	1800	120/1/60	27.88/27.88/28	
M2-DEF-2	TWIN CITY BCRD 300DHP	3RD FL ROOF	ROOF DOWNBLAST, DOME	EXHAUST AIR	7000	1.06	846	31.5	61.9	5	1.887	1800	460/3/60	52/52/41.88	
M2-DEF-3	TWIN CITY BCV 270	PENTHOUSE	BACKWARD INCLINED VENT	EXHAUST AIR	7200	3.76	1248	27	74	10	5.756	1800	460/3/60	44.63/45.94/60.56	1,2,4,7
M2-DEF-4	TWIN CITY BCRD 160D	SALLYPORT ROOF	ROOF DOWNBLAST, DOME	EXHAUST AIR	2000	0.63	1046	16.5	62.4	0.75	0.317	1800	460/3/60	33.81/33.81/35.25	9
M2-DEF-5	TWIN CITY BCRU 140B	CHILLER RM	ROOF UPBLAST, DOME	EXHAUST AIR	2550	0.3	1449	15	24.3	1	0.495	1800	460/3/60	31/31/32	2,4,5
M2-DEF-6	MK PLASTICS CNW 200	PENTHOUSE	BACKWARD INCLINED FRP	EXHAUST AIR	1000	2.95	2367	12.75	60.3	1.5	0.96	1800	460/3/60	20.31/27.19/28.44	2,4,8,10
M2-DEF-7	FANTECH DBF4XLT	LVL 1 LAUNDRY	INLINE	EXHAUST AIR	135	0.5	2800	---	---	72 W MAX	73 AMP MAX	1800	120/1/60	10 DIA / 8	10
M2-EF-3.1	TWIN CITY BC-SW 600	M2-AH-3	BACKWARD INCLINED SW	EXHAUST AIR	40000	4.31	592	60	76.6	50	35.344	1800	460/3/60	99.38/95.56/113.75	1,2,3,4
M2-EF-3.2	TWIN CITY BC-SW 600	M2-AH-3	BACKWARD INCLINED SW	EXHAUST AIR	40000	4.31	592	60	76.6	50	35.344	1800	460/3/60	99.38/95.56/113.75	1,2,3,4
M2-EF-4.1	TWIN CITY BC-SW 600	M2-AH-4	BACKWARD INCLINED SW	EXHAUST AIR	40000	4.31	592	60	76.6	50	35.344	1800	460/3/60	99.38/95.56/113.75	1,2,3,4
M2-EF-4.2	TWIN CITY BC-SW 600	M2-AH-4	BACKWARD INCLINED SW	EXHAUST AIR	40000	4.31	592	60	76.6	50	35.344	1800	460/3/60	99.38/95.56/113.75	1,2,3,4
M2-SF-1.1	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.2	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.3	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.4	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.5	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.6	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.7	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.8	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.9	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.10	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.11	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-1.12	TEMTRON FWT 18-90	M2-AH-1	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.1	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.2	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.3	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.4	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.5	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.6	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.7	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.8	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.9	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.10	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.11	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8
M2-SF-2.12	TEMTRON FWT 18-90	M2-AH-2	PLENUM, CENTRIFUGAL	SUPPLY AIR	6667	5.1	3293	18	70	15	7.9	3500	460/3/60	41.5/26/26	1,2,6,8

- 1. BACKWARD INCLINE CLASS III ALUMINUM AIRFOIL WHEEL.
- 2. ON EMERGENCY POWER.
- 3. PROVIDE SHAFT SEAL, TYPE B SPARK PROOF CONSTRUCTION, PHENOLIC COATING ON INTERNAL PARTS, UP BLAST, DRAIN PLUG AT BOTTOM.
- 4. VFD BY MECHANICAL. WIRED BY ELECTRICAL. SPECIFIED BY DIV 26.
- 5. CLASS II FAN
- 6. ON VFD BY AIR HANDLER MANUFACTURE..
- 7. PROVIDE SHAFT SEAL, TYPE B SPARK PROOF CONSTRUCTION, UP BLAST, DRAIN PLUG AT BOTTOM.
- 8. CLASS III FAN
- 9. PROVIDE ECM MOTOR.
- 10. CLOTHES DRYER BOOSTER FAN COMPLETE WITH PRESSURE SENSING SWITCH AND TUBING, STATUS INDICATOR PANEL WITH 50 FT CABLE & REMOTE MOUNT, 5 FT 120V POWER CORD, AND MOUNTING BRACKET.

FILTER SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	FILTRATION	TYPE	ARRANG.	AIR		PHYSICAL		NOTES
						CLEAN STATIC PRESSURE (IN. H2O)	DIRTY STATIC PRESSURE (IN. H2O)	NUMBER 24"X24" MODULES	NUMBER 12"X24" MODULES	
M2-DF-1	FARR 3030	ROOF	MERV 8	CARTRIDGE	FLAT	0.31	0.31	3	0	1
M2-DF-2	FARR HEPA	ROOF	MERV 20	HEPA	FLAT	1.35	1.35	3	0	1
M2-F-1.1	FARR 3030	M2-AH-1	MERV 8	CARTRIDGE	FLAT	0.31	0.31	50	15	2
M2-F-1.2	FARR RIGA-FLO	M2-AH-1	MERV 14	BAG	FLAT	0.53	0.53	50	15	2
M2-F-2.1	FARR 3030	M2-AH-2	MERV 8	CARTRIDGE	FLAT	0.31	0.31	50	15	2
M2-F-2.2	FARR RIGA-FLO	M2-AH-2	MERV 14	BAG	FLAT	0.53	0.53	50	15	2
M2-F-3	FARR 3030	M2-AH-3	MERV 8	CARTRIDGE	FLAT	0.31	0.31	50	15	2
M2-F-4	FARR 3030	M2-AH-4	MERV 8	CARTRIDGE	FLAT	0.31	0.31	50	15	2

- 1. PART OF BAG-IN/BAG-OUT GASKET SEAL FILTRATION SYSTEM CAMFIL MODEL CF-3X3-P27SU-012P-1GB-ASTST-SS W/BTFB-36-M DAMPERS
- 2. PROVIDE INDIVIDUAL GASKETTED FILTER FRAMES



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

Unified State
Laboratory
Module 2

4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

CHECKED BY: DL
DRAWN BY: DL

MECHANICAL
SCHEDULES

ME609
VOLUME 2

EXHAUST HOOD SCHEDULE												
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR		PHYSICAL					NOTES
					MAXIMUM AIRFLOW RATE (CFM)	STATIC PRESSURE (IN. WATER)	EXHAUST OPENING LENGTH / WIDTH (IN)	TOTAL HEIGHT (IN)	HOOD LENGTH / WIDTH (IN)	WEIGHT (LBS)		
EH-1	GREENHECK GD2	REAGENT PREP 213D	2	HEAT & CONDENSATE	450	0.034	11x11	24	36/36	130	(1)(2)	
EH-2	GREENHECK GD2	PEST. FORMULATION LAB 301A	2	HEAT & CONDENSATE	1275	0.036	36x12	24	132/36	520	(1)(2)	
EH-3	GREENHECK GD2	PEST. RESIDUE EXTRACTION LAB 302	2	HEAT & CONDENSATE	1050	0.03	23x12	24	84/36	310	(1)(2)	
EH-4	GREENHECK GD2	MEAT LAB 313	2	HEAT & CONDENSATE	975	0.031	23x12	24	78/36	310	(1)(2)	
EH-5	GREENHECK GD2	FURNACE 315D	2	HEAT & CONDENSATE	1725	0.04	36x12	24	138/36	545	(1)(2)	
EH-6	GREENHECK GD2	FURNACE 315D	2	HEAT & CONDENSATE	600	0.032	14x12	24	48/36	190	(1)(2)	
EH-7	GREENHECK GD2	PATH 313A	2	HEAT & CONDENSATE	1200	0.035	29x11	24	96/36	380	(1)(2)	
EH-8	GREENHECK GD2	SPECIAL PROCEDURE AUTOPSY 124A	2	HEAT & CONDENSATE	600	0.032	14x12	24	48/36	190	(1)(2)	
EH-9	GREENHECK GD2	INSTRUMENT LAB 211B	2	HEAT & CONDENSATE	1200	0.035	29x11	24	96/36	380	(1)(2)	
EH-10	GREENHECK GD2	PATH 313A	2	HEAT & CONDENSATE	450	0.034	11x11	24	36/36	130	(1)(2)	

- (1) 430 STAINLESS STEEL CONSTRUCTION.
(2) EXHAUST HOOD COMES COMPLETE WITH CONDENSATE BAFFLE.

HOOD SCHEDULE										
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR		PHYSICAL			NOTES
					MAXIMUM AIRFLOW RATE (CFM)	STATIC PRESSURE (IN. H2O)	INLET HEIGHT ABOVE ROOF (IN)	TOTAL HEIGHT (IN)	THROAT LENGTH/ WIDTH (IN)	
M2-H-1	COOK VI	BOILER RM	SINGLE	INTAKE	4000	0.1	14	--	30/39	1,2

1. PROVIDE MOTORIZED DAMPER.
2. ON EMERGENCY POWER.

LOUVER SCHEDULE									
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR		PHYSICAL		NOTES
					MAXIMUM AIRFLOW RATE (CFM)	STATIC PRESSURE (IN. H2O)	WIDTH/ HEIGHT/ THICKNESS (IN)		
L-1	RUSKIN ELF6375DX	PENTHOUSE	STATIONARY	INTAKE	80000	0.1	238/144/6	1	
L-2	RUSKIN ELF6375DX	PENTHOUSE	STATIONARY	INTAKE	80000	0.1	238/144/6	1	
L-3	RUSKIN ELF6375DX	PENTHOUSE	STATIONARY	INTAKE	20000	0.1	72/96/6	1	
L-4	RUSKIN ELF6375DX	PENTHOUSE	STATIONARY	INTAKE	20000	0.1	72/96/6	1	

1. BAKED ENAMEL FINISH OF COLOR SELECTED BY ARCHITECT.

CEILING RADIANT HEAT PANEL SCHEDULE										
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	EFFECTIVE LENGTH (FT)	TUBES	MINIMUM HEATING CAPACITY (BTUH/FT)	FLUID		PHYSICAL		NOTES
						ENTERING/ LEAVING FLUID TEMP (DEG. F)	TOTAL FLOW PER PANEL (GPM)	PANEL WIDTH (IN)		
RP-1	PRICE RPL	(3)	(3)	6	131	130/110	(3)	18	(1)(2)(4)(5)	

1. REFER TO ARCHITECTURAL CEILING PLANS FOR EXACT LENGTHS AS ABOVE DATA IS APPROXIMATE. COLOR TO MATCH SURROUNDING.
2. FIELD VERIFY ALL SIZES AND METERING OF ENDS.
3. SEE PLANS.
4. DIVISION 23 SHALL PROVIDE AND INSTALL 3" THICK, 1.5 LB DENSITY FIBERGLASS INSULATION ON TOP OF RADIANT PANELS.
5. ALL CAPACITIES BASED ON 70 DEG-F ROOM TEMPERATURE, 120 DEG-F AVERAGE WATER TEMPERATURE, AND HOT WATER AS WORKING FLUID.
6. PANELS SHALL APPEAR CONTINUOUS WITH NO VISIBLE JOINTS AND SHALL HAVE SMOOTH FINISH.



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

Unified State
Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

CHECKED BY: _____
DRAWN BY: DL

MECHANICAL
SCHEDULES

ME611
VOLUME 2

PUMP SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FLUID			PUMP			ELECTRICAL			NOTES
				FLOW RATE (GPM)	WORKING FLUID	HEAD LOSS (FT)	EFFICIENCY (%)	CONSTRUCTION	MOTOR SIZE (HP)	MOTOR BHP (HP)	MOTOR SPEED (RPM)	VOLT/PH/Hz	
M2-P-1	B & G VIT-CATM 8 X 13 CMC	CHILLER RM	SUMP	973.7	WATER	70.7	82	OTHER	30	23.3	1750	460/3/60	1,2
M2-P-2	B & G VIT-CATM 8 X 13 CMC	CHILLER RM	SUMP	973.7	WATER	70.7	82	OTHER	30	23.3	1750	460/3/60	1,2
M2-P-3	TACO FI6011	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	1344.6	WATER	68.7	82.5	BRONZE FITTED	30	28.213	1760	460/3/60	2,4
M2-P-4	TACO FI4009C	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	576.1	WATER	68.7	80.2	BRONZE FITTED	20	12.434	1760	460/3/60	2,4
M2-P-5	TACO FI4013	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	495	WATER	157.9	76.7	BRONZE FITTED	50	26.912	1760	460/3/60	2,4
M2-P-6	TACO FI6011	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	892.2	WATER	30.7	81	BRONZE FITTED	10	8.556	1160	460/3/60	4
M2-P-7	TACO FI4007	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	382.2	WATER	30.4	78.3	BRONZE FITTED	5	3.754	1760	460/3/60	4
M2-P-8	TACO FI4013	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	636.7	WATER	139.9	79.7	BRONZE FITTED	50	28.236	1760	460/3/60	2,4
M2-P-9	TACO FI4013	CHILLER ROOM	HORIZ FRAME-MOUNT END-SUCTION	636.7	WATER	139.9	79.7	BRONZE FITTED	50	28.236	1760	460/3/60	2,4
M2-P-10	TACO KV4007	BOILER RM	VERTICAL CLOSE-COUPLED INLINE	326.2	WATER	27.5	78.8	BRONZE FITTED	3	2.829	1760	460/3/60	3
M2-P-11	TACO KV4007	BOILER RM	VERTICAL CLOSE-COUPLED INLINE	326.2	WATER	27.5	78.8	BRONZE FITTED	3	2.829	1760	460/3/60	3
M2-P-12	TACO VR30@29FT	BOILER RM	VERTICAL CLOSE-COUPLED INLINE	163.1	WATER	27.5	N/A	IRON	2.175	N/A	3450	460/3/60	3
M2-P-13	TACO FI5013	BOILER RM	HORIZ FRAME-MOUNT END-SUCTION	818.1	WATER	136.7	82.5	BRONZE FITTED	50	33.684	1760	460/3/60	2,3,4
M2-P-14	TACO FI5013	BOILER RM	HORIZ FRAME-MOUNT END-SUCTION	818.1	WATER	136.7	82.5	BRONZE FITTED	50	33.684	1760	460/3/60	2,3,4
M2-P-15	TACO FI4013	PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	433.8	40% P GLY	79.8	75.3	BRONZE FITTED	25	11.933	1760	460/3/60	2,3,4
M2-P-16	TACO FI4013	PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	433.8	40% P GLY	79.8	75.3	BRONZE FITTED	25	11.933	1760	460/3/60	2,3,4
M2-P-17	TACO FI3011	PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	258.5	40% P GLY	104.3	66.8	BRONZE FITTED	20	10.534	1760	460/3/60	4
M2-P-18	TACO FI3011	PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	258.5	40% P GLY	104.3	66.8	BRONZE FITTED	20	10.534	1760	460/3/60	4
M2-P-19	TACO FI1206	PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	35.7	40% P GLY	65	45.2	BRONZE FITTED	2	1.352	3500	460/3/60	3,4
M2-P-20	TACO FH1507	PENTHOUSE	HORIZ FRAME-MOUNT END-SUCTION	51.2	WATER	55.8	52	BRONZE FITTED	3	1.391	1760	460/3/60	3,4
M2-P-21	B & G 90 1 1/2A	BOILER RM	VERTICAL CLOSE-COUPLED INLINE	10	DHW	30	N/A	BRONZE FITTED	0.5	0.27	1725	120/1760	
M2-P-22	B & G 90 1AA	BOILER RM	VERTICAL CLOSE-COUPLED INLINE	33	WATER	39	N/A	BRONZE FITTED	1	0.88	3450	460/3/60	
M2-P-23	B & G 90 1AA	BOILER RM	VERTICAL CLOSE-COUPLED INLINE	33	WATER	39	N/A	BRONZE FITTED	1	0.88	3450	460/3/60	

1. VERTICAL TURBINE PUMP WITH INLET STRAINER. THREE BOWLS
2. VFD BY MECHANICAL. WIRED BY ELECTRICAL. SPECIFIED BY DIV 26.
3. ON EMERGENCY POWER
4. PROVIDE SUCTION DIFFUSER.

SNORKEL EXHAUST SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	AIRFLOW (CFM)	PRESSURE DROP (IN H2O)	PHYSICAL		NOTES
					INLET DIAMETER (IN)	LENGTH (FT)	
SE-1	AIRFLOW SYSTEMS 4E08	GRIND 1 315C	300	1.1	4	8	(1)
SE-2	AIRFLOW SYSTEMS 4E08	GRIND 1 315C	300	1.1	4	8	(1)
SE-3	AIRFLOW SYSTEMS 4E08	GRIND 2 315A	300	1.1	4	8	(1)
SE-4	AIRFLOW SYSTEMS 4E08	GRIND 2 315A	300	1.1	4	8	(1)

- (1) CEILING MOUNTED ARTICULATED EXHAUST ARM ASSEMBLY COMPLETE WITH FLANGED INLET HOOD. PROVIDE ALL ACCESSORIES REQUIRED FOR CEILING MOUNTING.

SPACE SCHEDULE

ID	LOCATION	AIRFLOW (HEATING SEASON/COOLING SEASON)					AIR		NOTES	
		SUPPLY AIRFLOW RATE (CFM)	RETURN AIRFLOW RATE (CFM)	RELIEF AIRFLOW RATE (CFM)	OUTSIDE AIRFLOW RATE (CFM)	EXHAUST AIRFLOW RATE (CFM)	PRESSURIZATION AIRFLOW RATE (CFM)	VENTILATION AIRFLOW RATE (CFM)		HEATING SEASON DB/RH COOLING SEASON (*F/%)
LAB AND OFFICE SPACES		160000/160000	0/0	0/0	160000/160000	160000/160000	0/0	160000/160000	72/30 72/45	

STACK SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR		PHYSICAL		NOTES
					MAXIMUM AIRFLOW RATE (CFM)	STATIC PRESSURE (IN. H2O)	TOTAL HEIGHT (IN)	THROAT DIAMETER (IN)	
M2-STK-1	CONTRACTOR FIELD FABRICATED	PENTHOUSE ROOF	FLAT	EXHAUST	40000	0.5	120	42	1,3
M2-STK-2	CONTRACTOR FIELD FABRICATED	PENTHOUSE ROOF	FLAT	EXHAUST	40000	0.5	120	42	1,3
M2-STK-3	CONTRACTOR FIELD FABRICATED	PENTHOUSE ROOF	FLAT	EXHAUST	40000	0.5	120	42	1,3
M2-STK-4	CONTRACTOR FIELD FABRICATED	PENTHOUSE ROOF	FLAT	EXHAUST	40000	0.5	120	42	1,3
M2-STK-5	CONTRACTOR FIELD FABRICATED	PENTHOUSE ROOF	FLAT	EXHAUST	7200	0.5	120	20	1,3
M2-STK-6	CONTRACTOR FIELD FABRICATED	PENTHOUSE ROOF	FLAT	EXHAUST	1000	0.75	120	8	2,3

1. EPOXY COATED STEEL STACK CONSTRUCTED PER SMACNA GUIDELINES FOR 150 MPH WIND. PAINT COLOR TO BE SELECTED BY ARCHITECT.
2. FRP STACK. CONSTRUCTED TO WITHSTAND 150 MPH WIND. COLOR TO BE SELECTED BY ARCHITECT.
3. STACK HEIGHT LISTED IS ABOVE ROOF INSULATION

HOLDING STORAGE TANK SCHEDULE

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FLUID			PHYSICAL		NOTES
				FLOW RATE (GPM)	WORKING FLUID	INLET/OUTLET HEAD LOSS (FT)	DIAMETER/LENGTH (IN)	TANK SIZE (GAL)	
M2-STOR-1	AO SMITH TJV 80A	PENTHOUSE	CLOSED, VERTICAL	35.7	40% P GLY	1/1	27/55	80	1

1. WITH INSULATING JACKET.



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services



DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

Unified State
Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

CHECKED BY	Checker
DRAWN BY	DL

MECHANICAL SCHEDULES

ME612
VOLUME 2

1

2

3

4

5

KEYED NOTES

- 1 HYDROGEN GENERATOR, FURNISHED BY OTHERS. COORDINATE WITH LAB PLANS.
- 2 HYDROGEN GENERATOR SHOWN AT THIS LOCATION FOR CLARITY. COORDINATE EXACT LOCATION WITH LAB PLANS.
- 3 DROP PIPING THRU WALL, EXTEND THRU CABINETY TO WORK BENCH RACEWAY AND OUT TO BENCH TOP OUTLETS.
- 4 SWEDGELOK ELECTRO-POLISHED STAINLESS STEEL TUBING.
- 5 FSP TO RISE TO HOSE VALVE ON ROOF. INCLUDE SHUTOFF VALVE IN HEATED SPACE ACCESSIBLE FROM ROOF. LOCATE ALL VALVES AND OUTLETS A MINIMUM OF 10-FEET AWAY FROM EDGE OF ROOF.
- 6 CALIBRATED CIRCUIT SETTER BALANCING VALVE AT THE END OF IHW AND ES CIRCULATION LOOP. BALANCE TO FLOW INDICATED.
- 7 1-1/4" DHW LOOP AND 3/4" DCW DN.
- 8 PROVIDE PRESSURE REGULATOR AND MAINFOLD AT GAS TANKS.
- 9 CHANGE OVER MANIFOLD, WIRE MANIFOLD TO REMOTE ENUNCIATOR. COORDINATE ENUNCIATOR LOCATION WITH LAB PLANS.
- 10 REMOTE ENUNCIATOR FOR CHANGE OVER MANIFOLDS.
- 11 DROP PIPING THRU UMBILICAL AND EXTEND THRU CABINETY RACEWAY TO COUNTER OUTLETS.
- 12 EACH PIPE IN RACEWAY TO BE 1/2".



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah

Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

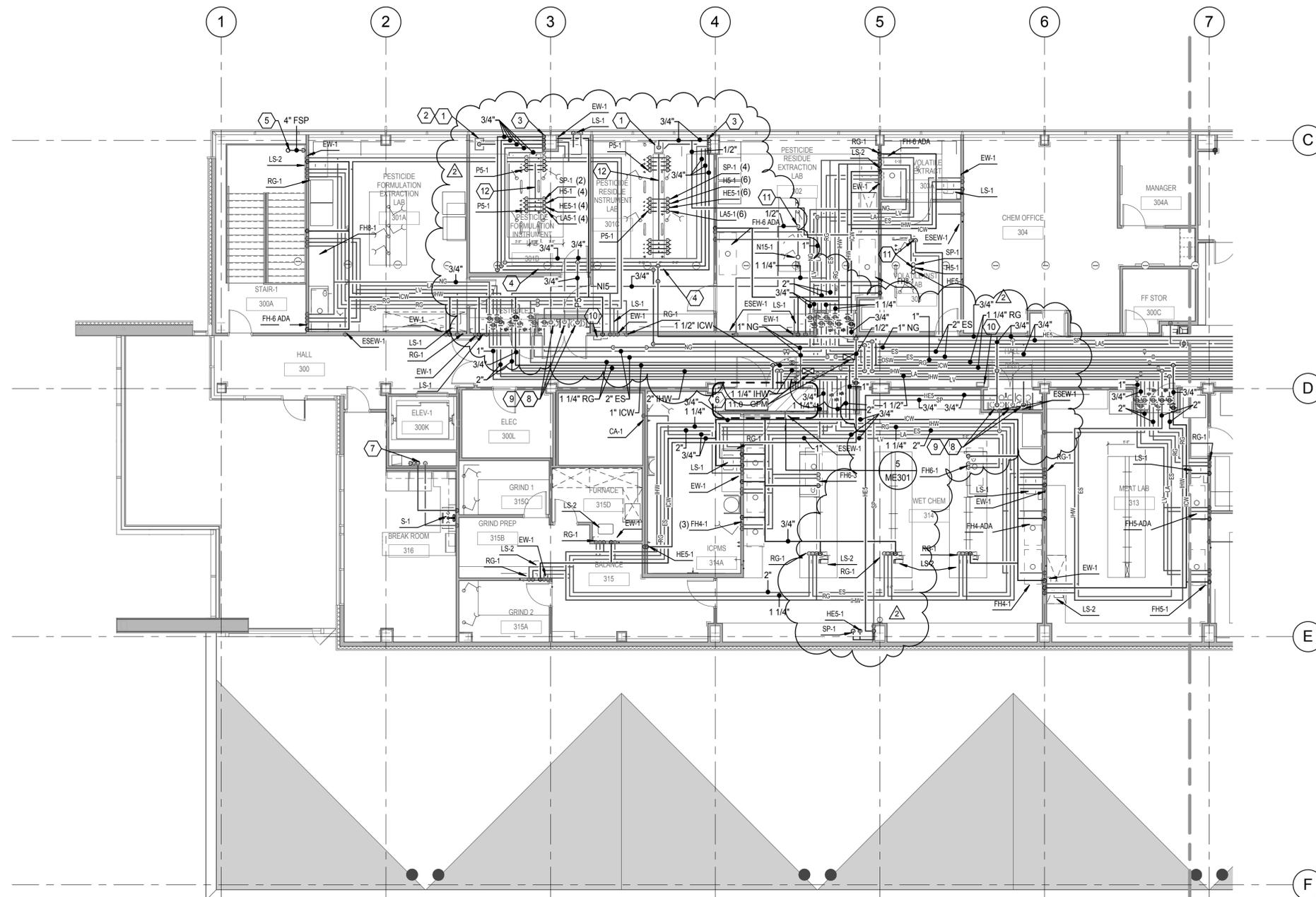
DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

CHECKED BY: J. Messer
DRAWN BY: DL

LEVEL 3 PLUMBING PLAN AREA A

PE103A

VOLUME 2

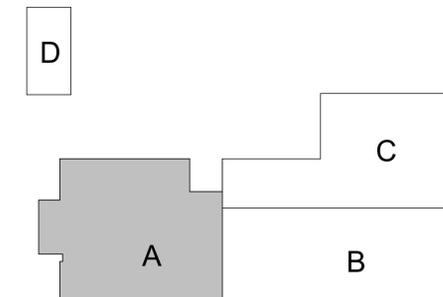


LEVEL 3 PLUMBING PLAN AREA A

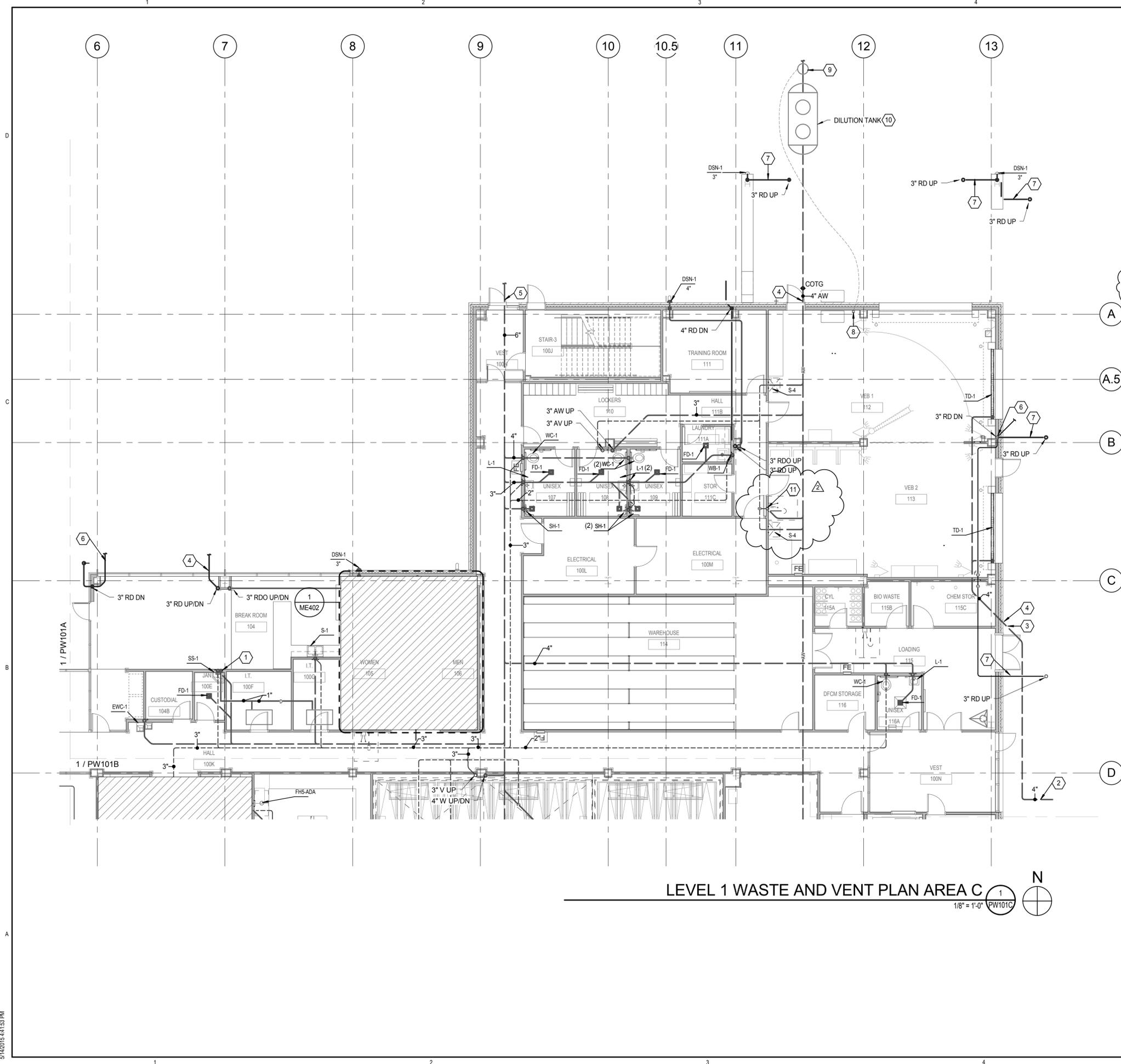
1/8" = 1'-0" PE103A



KEY PLAN



D:\BIM\Local Files\13245-Unified Lab Mod HV13-Mechanical-Central_Lineback.rvt
 5/14/2015 4:41:50 PM



LEVEL 1 WASTE AND VENT PLAN AREA C
 1/8" = 1'-0" PW101C

KEYED NOTES

- 1 EXTEND CONDENSATE DRAIN LINE AND SLOPE TO JANITOR SINK.
- 2 WASTE LINE FROM GARAGE. SEE SHEET PW101C.
- 3 WASTE LINE TO SAND/OIL INTERCEPTOR. SEE SHEET PW101B FOR CONTINUATION.
- 4 LEAVING INVERT ELEVATION: 46" BELOW FINISHED FLOOR.
- 5 LEAVING INVERT ELEVATION: 54" BELOW FINISHED FLOOR.
- 6 LEAVING INVERT ELEVATION: 33" BELOW FINISHED FLOOR.
- 7 PROVIDE RAYCHEM 8XL-TRACE 8W/FT, 120V HEAT CABLE IN CANOPY DRAINS.
- 8 IPEX NEUTRASYSYSTEM 2 PH MONITORING SYSTEM WITH PROBE, ALARM AND CHART. INSTALL PROBE IN SAMPLING MANHOLE. TIE MONITOR INTO BMS. 120 VAC.
- 9 SAMPLING MANHOLE WITH PH PROBE.
- 10 CONTAINMENT SOLUTIONS DWT 6(6) 3000 3000 GAL-TANK. TANK TO HAVE VINYL-ESTER LINER.
- 11 CONNECT EYEWASH ON SAFETY STATION TO ACID WASTE SYSTEM.



649 E. South Temple
 Salt Lake City, UT 84102
 801.355.5915



11798 N. Lakeridge Pkwy.
 Ashland, VA 23005
 804-228-7473

State of Utah
 Department of Administrative Services

Division of Facilities
 Construction & Management
 4110 State Office Building
 Salt Lake City, Utah 84114
 Phone: (801) 538 - 3018
 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

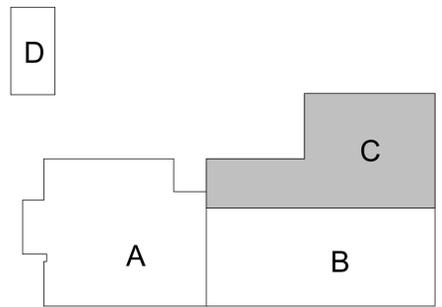
Unified State
 Laboratory
 Module 2
 4451 South 2700 West,
 Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

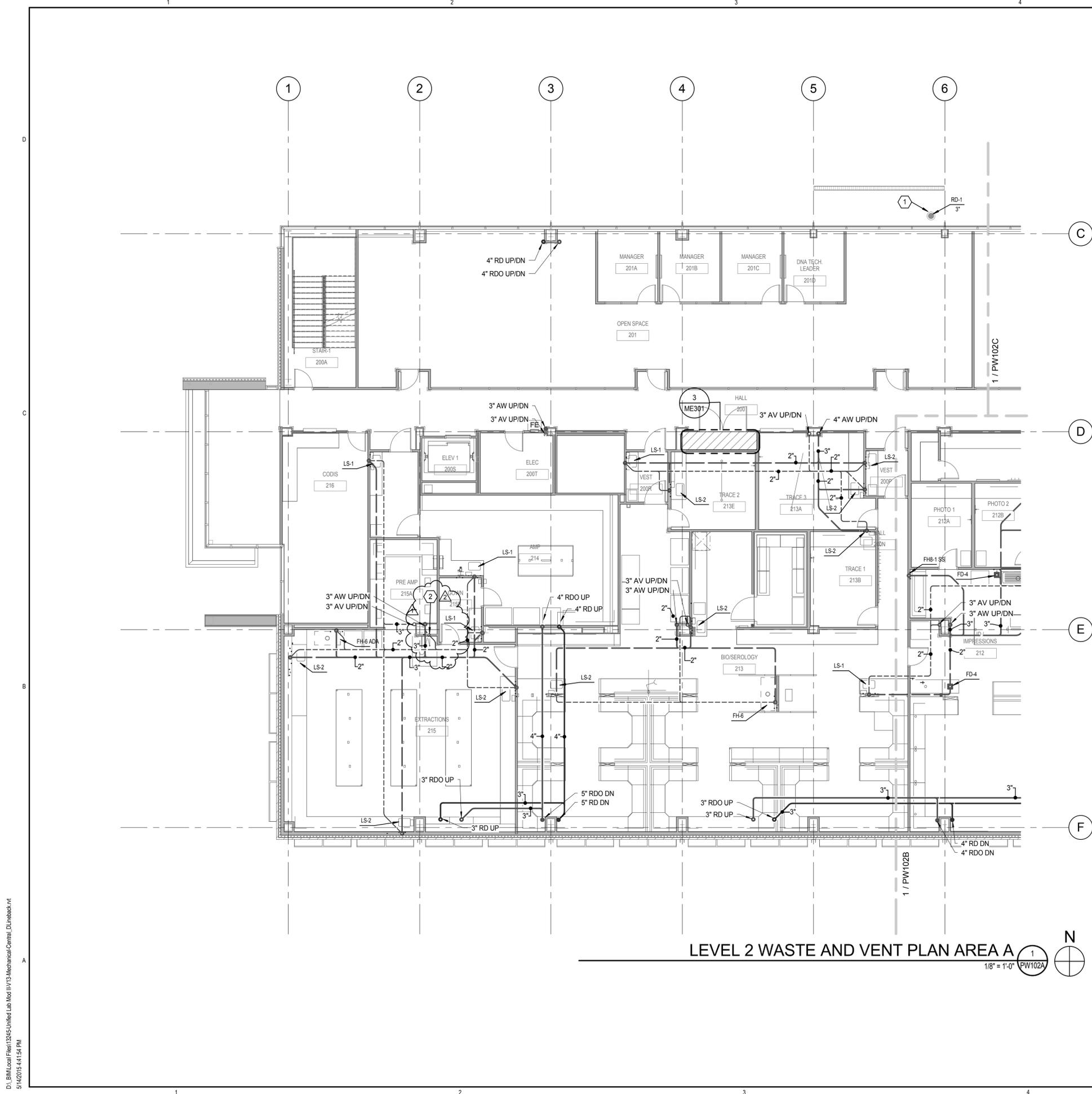
DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

KEY PLAN



LEVEL 1 WASTE AND VENT PLAN AREA C

PW101C
 VOLUME 2



- ### KEYED NOTES
- 1 PROVIDE FREEZE PROTECTION CABLE IN EXTERIOR ROOF DRAINAGE PIPING.
 - 2 CONNECT EYEWASH ON SAFETY STATION TO ACID WASTE SYSTEM.

CRSA
 649 E. South Temple
 Salt Lake City, UT 84102
 801.355.5915

MWL
 11798 N. Lakeridge Pkwy.
 Ashland, VA 23005
 804-228-7473

State of Utah
 Department of Administrative Services

Division of Facilities
 Construction & Management
 4110 State Office Building
 Salt Lake City, Utah 84114
 Phone: (801) 538 - 3018
 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

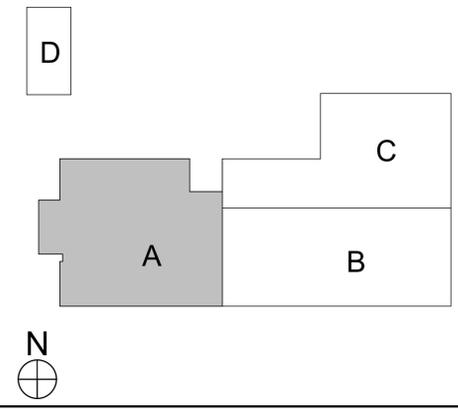


ARCHITECT-ENGINEER STAMP

**Unified State
 Laboratory
 Module 2**
 4451 South 2700 West,
 Taylorsville, UT 84118

DFCM #:	13020300
Project #:	B13-024
DATE:	ISSUE TYPE:
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

KEY PLAN



LEVEL 2 WASTE AND VENT PLAN AREA A
 1/8" = 1'-0" PW102A

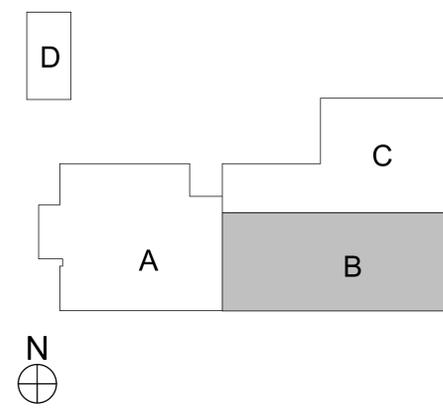
**A LEVEL 2 WASTE AND
 VENT PLAN AREA A**

PW102A
 VOLUME 2

KEYED NOTES

- 1. CONDENSATE DRAIN FROM IT FAN COIL UNIT
- 2. CONNECT EYEWASH ON SAFETY STATION TO ACID WASTE SYSTEM.

KEY PLAN



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

Unified State
Laboratory
Module 2
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

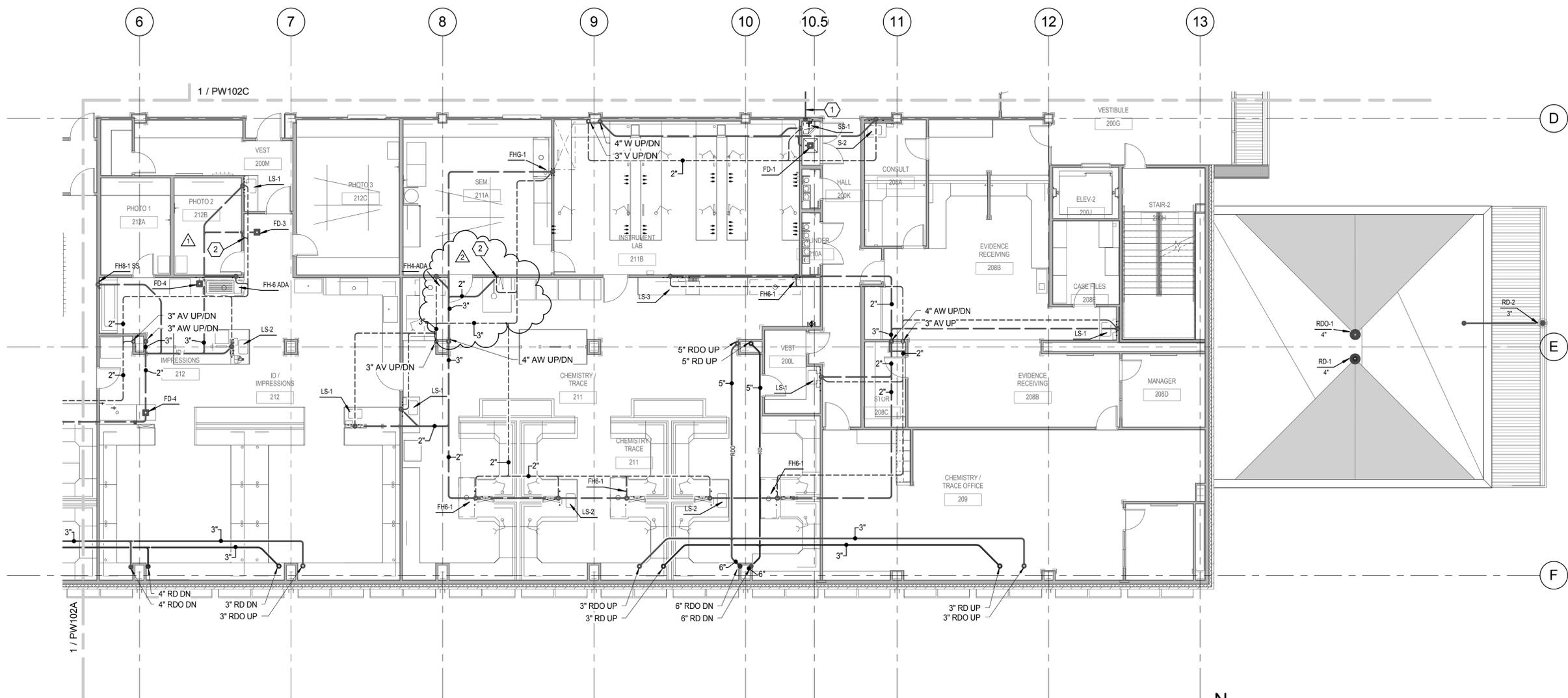
DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

CHECKED BY: _____
DRAWN BY: DL

A LEVEL 2 WASTE AND VENT PLAN AREA B

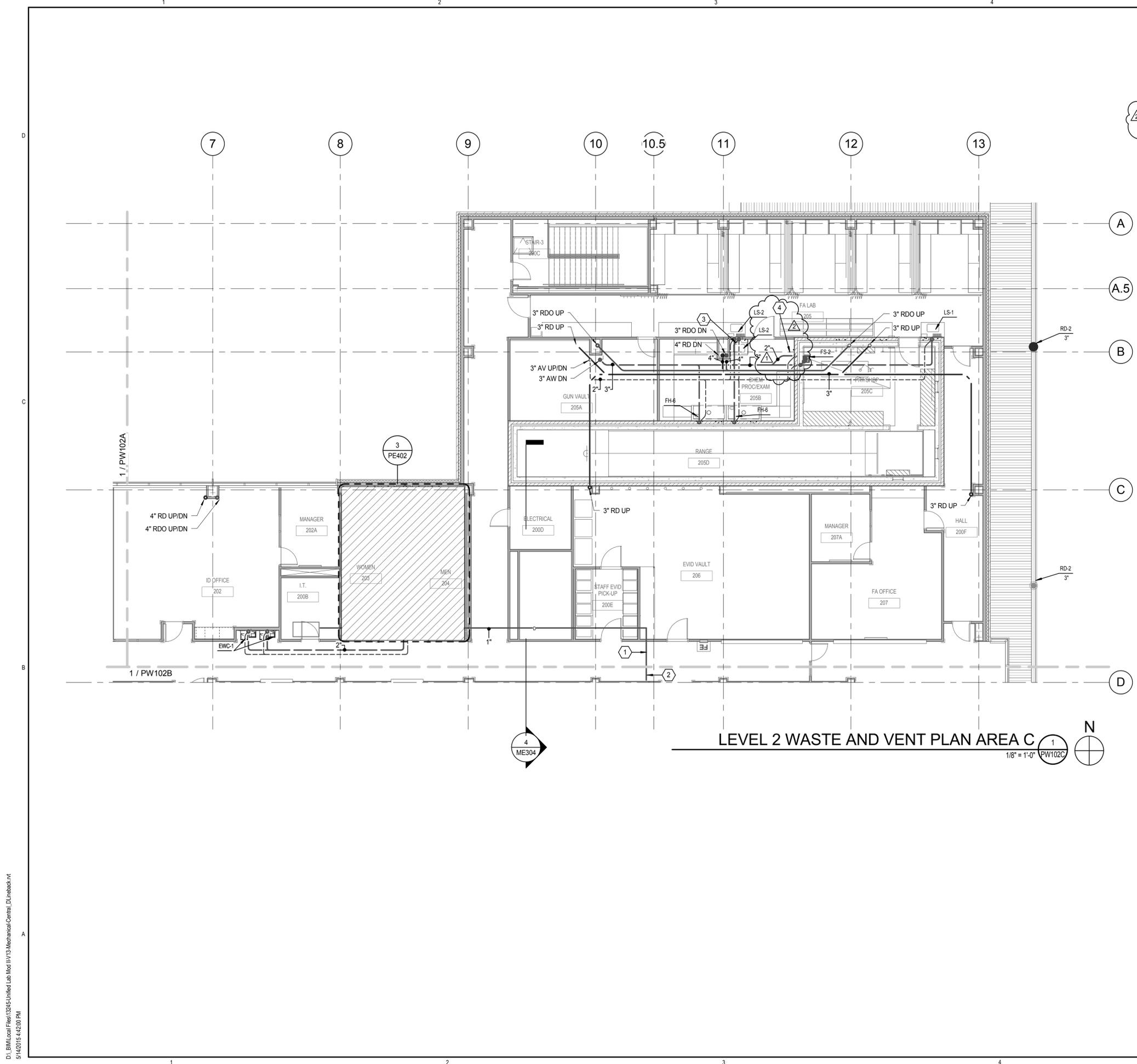
PW102B

VOLUME 2



LEVEL 2 WASTE AND VENT PLAN AREA B
1/8" = 1'-0" PW102B

D:\BIM\Local Files\13245-Unified Lab Mod II\13-Mechanical\Central_DL\inback.vr 5/14/2015 4:11:57 PM



- ### KEYED NOTES
- 1 EXTEND CONDENSATE DRAIN LINE AND SLOPE TO JANITOR SINK.
 - 2 CONDENSATE DRAIN FROM IT FAN COIL UNIT.
 - 3 BACK TO BACK SINKS SERVED FROM THE SAME WASTE AND VENT LINES.
 - 4 CONNECT EYEWASH ON SAFETY STATION TO ACID WASTE SYSTEM.

CRSA
 649 E. South Temple
 Salt Lake City, UT 84102
 801.355.5915

MWL
 11798 N. Lakeridge Pkwy.
 Ashland, VA 23005
 804-228-7473

State of Utah
 Department of Administrative Services

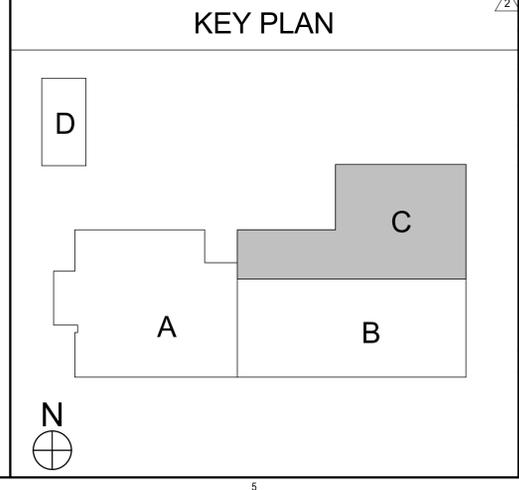
Division of Facilities
 Construction & Management
DFCM 4110 State Office Building
 Salt Lake City, Utah 84114
 Phone: (801) 538 - 3018
 Fax: (801) 538 - 3267

DFCM APPROVAL STAMP

ARCHITECT-ENGINEER STAMP

**Unified State Laboratory
 Module 2**
 4451 South 2700 West,
 Taylorsville, UT 84118

DFCM #:	13020300
Project #:	B13-024
DATE:	ISSUE TYPE:
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2



CHECKED BY	Checker
DRAWN BY	DL

LEVEL 2 WASTE AND VENT PLAN AREA C

PW102C
 VOLUME 2

D:\BIM\Local Files\13245-Unified Lab Mod II\13-Mechanical-Central_DL\Linkback.rvt 5/14/2015 4:42:00 PM

KEYED NOTES

- 1 EXTEND WASTE LINE THRU WALL BEFORE DROPPING TO LEVEL BELOW AT THIS POINT.
- 2 CONNECT EYEWASH ON SAFETY STATION TO ACID WASTE SYSTEM.



649 E. South Temple
Salt Lake City, UT 84102
801.355.5915



11798 N. Lakeridge Pkwy.
Ashland, VA 23005
804-228-7473

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

DFCM APPROVAL STAMP



ARCHITECT-ENGINEER STAMP

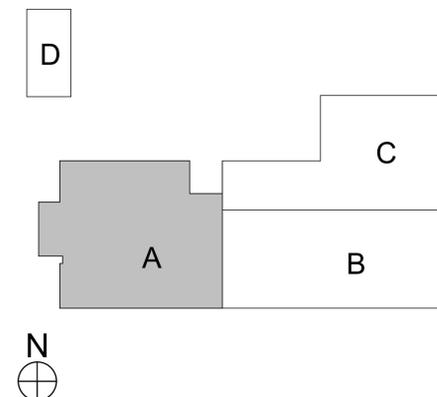
**Unified State
Laboratory
Module 2**
4451 South 2700 West,
Taylorsville, UT 84118

DFCM #: 13020300

Project #: B13-024

DATE	ISSUE TYPE
April 21, 2014	BID SET
May 8, 2015	ADD # 1
May 14, 2015	ADD # 2

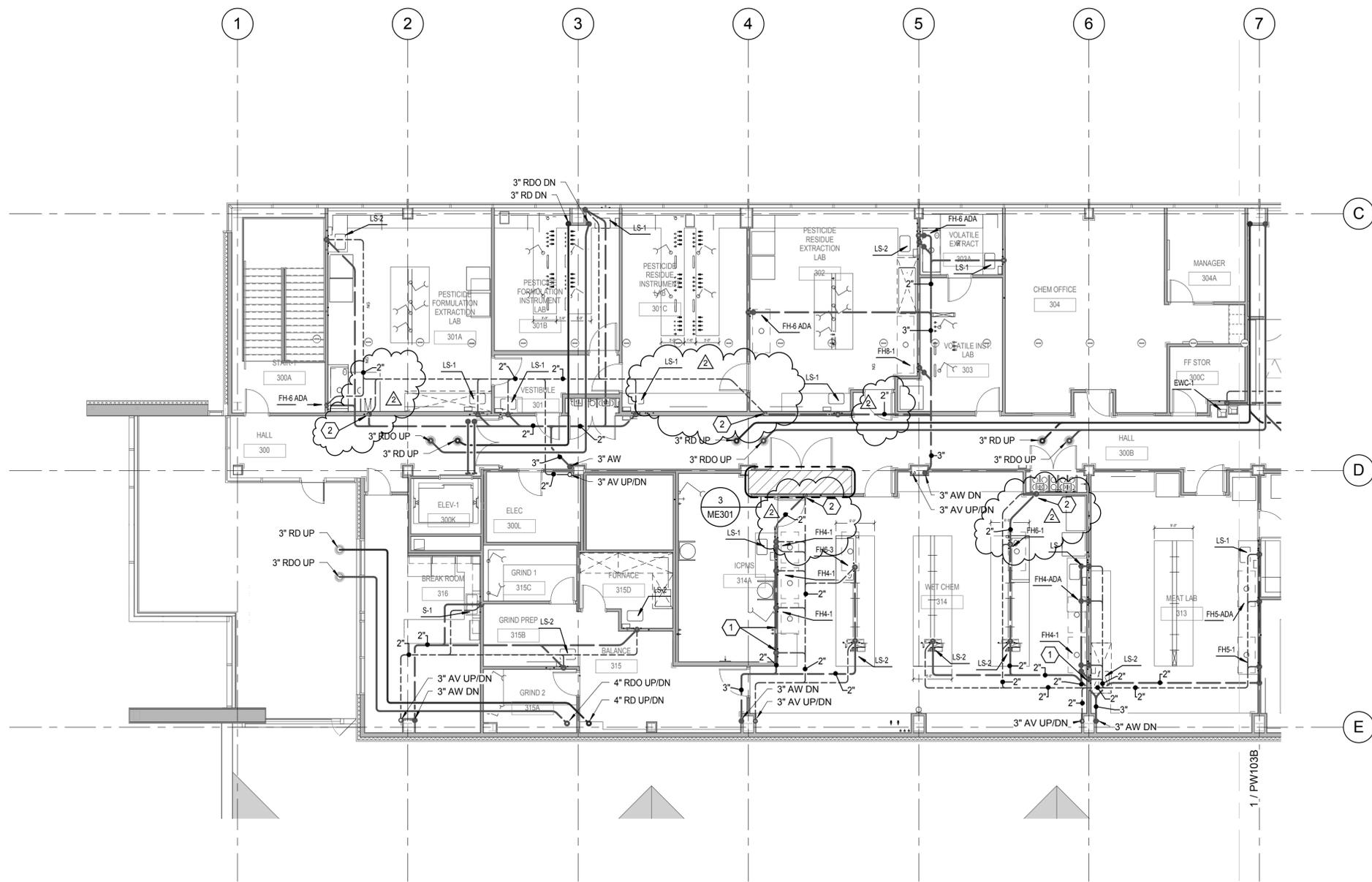
KEY PLAN



**A LEVEL 3 WASTE AND
VENT PLAN AREA A**

PW103A

VOLUME 2



LEVEL 3 WASTE AND VENT PLAN AREA A



D:\BIM\Local Files\13245-Unified Lab Mod HV13\Mechanical\Central_DL\Inback.rvt
5/14/2015 4:42:03 PM

SECTION 236417 CENTRIFUGAL MAGNETIC BEARING WATER CHILLERS (CH-2 and/or CH-1)

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. Packaged, water-cooled, electric-motor-driven centrifugal magnetic bearing chillers with VFD.
 2. Refrigerant monitors & breathing apparatus
 3. Provide interface with the Control system. The interface is to allow complete monitoring and control for all chiller functions.

1.3 DEFINITIONS

- A. BAS: Building automation system.
- B. IPLV: Integrated part-load value. A single-number part-load efficiency figure of merit calculated per the method defined by ARI 550/590 and referenced to ARI standard rating conditions.
- C. NPLV: Nonstandard part-load value. A single-number part-load efficiency figure of merit calculated per the method defined by ARI 550/590 and intended for operating conditions other than the ARI standard rating conditions.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specifications Sections.
- B. Product Data for each chiller, including chiller refrigerant, chiller capacity, condenser pressure drop, cooler pressure drop, weights (shipping, installed, and operating), furnished accessories, and electrical characteristics.
- C. Shop Drawings showing fabrication and installation of chillers, including plans, elevations, sections, details of components, attachments, and other construction elements. Include the following:
 1. Dimensions.
 2. Weight loadings and distribution.
 3. Clearances for maintenance and operation.
 4. Size and location of field connections.
- D. Wiring diagrams detailing wiring for power and control systems and differentiating between manufacturer-installed and field-installed wiring.
- E. Coordination Drawings showing the following:
 1. Structural supports.
 2. Piping roughing-in requirements.
 3. Wiring roughing-in requirements. Determine spaces reserved for electrical equipment.
 4. Access requirements around other work, including working clearances to mechanical controls and electrical equipment.

- F. Maintenance data for each chiller to include in the operation and maintenance manual specified in Division 1.
- G. Certification of performance and factory test results specified in "Source Quality Control" Article.

1.5 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Centrifugal chillers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Condenser-Fluid Temperature Performance:
 - 1. Startup Condenser-Fluid Temperature: Chiller shall be capable of starting with an entering condenser-fluid temperature of 55 deg F and providing stable operation.
 - 2. Minimum Operating Condenser-Fluid Temperature: Chiller shall be capable of continuous operation over the entire capacity range indicated with an entering condenser-fluid temperature of 55 deg F.
 - 3. Make factory modifications to standard chiller design if necessary to comply with performance indicated.
- C. Site Altitude: Chiller shall be suitable for altitude at which installed without affecting performance indicated. Make adjustments to affected chiller components to account for site altitude.
- D. Performance Tolerance: Comply with the following in lieu of ARI 550/590:
- E. Product Data: For each type of product indicated. Include refrigerant, rated capacities, operating characteristics, furnished specialties, and accessories.
 - 1. Performance at ARI standard conditions and at conditions indicated.
 - 2. Performance at ARI standard unloading conditions.
 - 3. Minimum evaporator flow rate.
 - 4. Refrigerant capacity of chiller.
 - 5. Fluid capacity of evaporator, condenser.
 - 6. Characteristics of safety relief valves.
 - 7. Minimum entering condenser-fluid temperature.
 - 8. Performance at varying capacities with constant design condenser-fluid temperature. Repeat performance at varying capacities for different condenser-fluid temperatures from design to minimum in 10 deg F increments.
- F. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, load distribution, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
- G. Coordination Drawings: Floor plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Structural supports.
 - 2. Piping roughing-in requirements.
 - 3. Wiring roughing-in requirements, including spaces reserved for electrical equipment.
 - 4. Access requirements, including working clearances for mechanical controls and electrical equipment, and tube pull and service clearances.
- H. Certificates: For certification required in "Quality Assurance" Article.
- I. Seismic Qualification Certificates: For chillers, accessories, and components, from manufacturer. Comply with Section 230548 "Vibration and Seismic Controls for HVAC" for the following:
 - 1. Basis for Certification.
 - 2. Dimensioned Outline Drawings of Equipment .
 - 3. Equipment anchorage devices on which the certification is based and their installation requirements.

- J. Source quality-control reports.
- K. Startup service reports.
- L. Operation and Maintenance Data: For each chiller to include in emergency, operation, and maintenance manuals.
- M. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

- A. ARI Certification: Certify chiller according to ARI 550 certification program.
- B. ARI Rating: Rate chiller performance according to requirements in ARI 550/590.
- C. ASHRAE Compliance:
 - 1. ASHRAE 15 for safety code for mechanical refrigeration.
 - 2. ASHRAE 147 for refrigerant leaks, recovery, and handling and storage requirements.
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1
- E. ASME Compliance: Fabricate and label chillers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1. For chillers charged with R-134a refrigerant, include an ASME U-stamp and nameplate certifying compliance. Chiller charged with R-123 will not be acceptable.
- F. Comply with NFPA 70.
- G. Comply with requirements of UL and UL Canada, and include label by a qualified testing agency showing compliance.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Ship chillers from the factory fully charged with R-134a refrigerant.

1.8 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases.
- B. Coordinate sizes, locations, and anchoring attachments of structural-steel support structures.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chillers that fail in materials or workmanship within specified warranty period.
 - 1. Extended warranties include, but are not limited to, the following:
 - a. Complete chiller including refrigerant.
 - b. Complete compressor and drive assembly including refrigerant.
 - c. Refrigerant.
 - d. Parts and labor.
 - e. Loss of refrigerant charge for any reason.
 - f. **Include cost to replace capacitor banks as necessary.**
 - 2. Warranty Period: ~~Two~~ **Ten** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Arctic Cool.
- B. ~~McQuay International.~~ Diakin Applied
- C. Multistack.
- D. Smardt.
- E. York
- F. Specific model by each of the above manufacturers shall be submitted to the engineer with performance & dimensional information. Material construction such as tube type & thickness, provision of unit mounted VFDs, vessel insulation, etc. and warranty must be complied with as specified for any or all chillers to be accepted for use on the project. Sound levels as specified must be met & guaranteed by the chiller manufacturer.

2.2 UNIT DESCRIPTION

- A. Provide and install as shown on the plans a factory assembled, charged, and run-tested water-cooled packaged chiller. Each unit shall be complete with ~~two~~ **one or more** multi-stage, oil-free, magnetic bearing, hermetic centrifugal compressors. Each compressor shall have variable frequency drive operating in concert with inlet guide vanes for optimized unit part load efficiency. The evaporator, condenser, and **electronic** expansion valve shall be common to both of the compressors. The chiller unit shall be capable of running on one compressor with the other compressor or any of its auxiliaries inoperable or removed.
- B. Fabricate chiller mounting base with reinforcement strong enough to resist chiller movement during a seismic event. Comply with Section 230548 "Vibration and Seismic Controls for HVAC."

2.3 DESIGN REQUIREMENTS

- A. General: Provide a complete water-cooled, dual semi-hermetic, field serviceable compressor centrifugal water chiller as specified herein. Machine shall be provided according to standards, Section 1.2. In general, unit shall consist of two magnetic bearing, completely oil-free, compressors, refrigerant condenser and evaporator, and control systems including variable frequency drive, operating controls and equipment protection controls. Note: Chillers shall be charged with a refrigerant such as HFC-134a, not subject to phase-out by the Montreal Protocol and the U. S. Clean Air Act.
- B. Performance: Refer to schedule on the drawings. The chiller shall be capable of stable operation to ~~ten~~ **fifteen** percent (~~40~~ **15**%) of full load capacity with standard ARI entering condensing water relief without hot gas bypass.
- C. Acoustics: Sound pressure for the unit shall not exceed the specified levels. If the sound levels shown herein cannot be achieved by the chiller manufacturer with its standard machine then it must provide whatever necessary acoustic treatment to the chiller is required to achieve the sound levels. Sound data

shall be measured according to ARI Standard 575-2008 and shall be in dB. Data shall be the highest levels recorded at all load points.

2.4 CHILLER COMPONENTS

A. Compressors:

1. The unit shall have ~~two~~ **one or more** two-stage, magnetic bearing, oil-free, hermetic centrifugal compressors. The compressor drive train shall be capable of coming to a controlled, safe stop in the event of a power failure.
2. Movable inlet guide vanes, acting together with variable speed drive, shall provide unloading. A microprocessor controller, dedicated to each compressor shall coordinate the vane and speed control to provide optimum unit efficiency.

2.5 REFRIGERATION

A. Refrigerant:

1. Type: R-134a; ASHRAE 34, Class A1.
2. Compatibility: Chiller parts exposed to refrigerants shall be fully compatible with refrigerants, and pressure components shall be rated for refrigerant pressures.

B. Refrigerant Flow Control: Varying, or modulating, refrigerant flow-control device satisfying performance requirements indicated.

C. Pressure Relief Device:

1. Comply with requirements in ASHRAE 15 and in applicable portions of ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
2. For Chillers Using R-134a: ASME-rated, spring-loaded, pressure relief valve; single- or multiple-reseating type. Pressure relief valve(s) shall be provided for each heat exchanger. Condenser shall have dual valves with one being redundant and configured to allow either valve to be replaced without loss of refrigerant.

D. Refrigeration Transfer: Provide service valves and other factory-installed accessories required to facilitate transfer of refrigerant from chiller to a remote refrigerant storage and recycling system. Comply with requirements in ASHRAE 15 and ASHRAE 147.

E. Refrigerant Isolation for Chillers Using R-134a: Factory install isolation **or check** valves in the compressor discharge line to the condenser and the refrigerant liquid line leaving the condenser to allow for isolation and storage of full refrigerant charge in the chiller condenser shell. In addition, provide isolation valve on suction side of compressor from evaporator to allow for isolation and storage of full refrigerant charge in the chiller evaporator shell.

2.6 EVAPORATOR

A. Description: Shell-and-tube design with water in tubes and refrigerant surrounding tubes within shell. Shell is separate from condenser.

B. Shell Material: Carbon-steel rolled plates with continuously welded seams or seamless pipe.

C. Designed to prevent liquid refrigerant carryover from entering compressor.

D. Provide evaporator with sight glass or other form of positive visual verification of liquid-refrigerant level.

E. Tubes:

1. Individually replaceable from either end and without damage to tube sheets and other tubes.
2. Mechanically expanded into end sheets and physically attached to intermediate tube sheets.
3. Material: Copper.

4. Nominal OD: 3/4 inch.
 5. Minimum Wall Thickness: ~~0.025~~ 0.028 inch.
 6. External Finish: Manufacturer's standard.
 7. Internal Finish: Enhanced.
- F. End Tube Sheets: Continuously welded to each end of shell; drilled and reamed to accommodate tubes with positive dual seals between fluid in tubes and refrigerant in shell.
- G. Intermediate Tube Sheets: Installed in shell and spaced along length of tube at intervals required to eliminate vibration and to avoid contact of tubes resulting in abrasion and wear.
- H. Water Box:
1. Cast-iron or carbon-steel construction; arranged to provide visual inspection and cleaning of tubes from either end without disturbing refrigerant in shell.
 2. Standard type for water box with piping connections. Standard type for water box without piping connections.
 3. Provide water boxes with lifting lugs or eyebolts.
 - 4.
 5. Nozzle Pipe Connections: Grooved for mechanical-joint coupling.
 6. Thermistor or RTD temperature sensor factory installed in each nozzle.
 7. Fit each water box with 3/4-inch drain connection at low point and vent connection at high point, each with threaded plug.
- I. Additional Corrosion Protection:
1. Coat wetted surfaces with a corrosion-resistant finish.
 2. Using same material as tubes, clad surfaces of end tube sheets in contact with fluid. Coat other wetted surfaces, including water boxes, with a corrosion-resistant finish.

2.7 CONDENSER

- A. Description: Shell-and-tube design with water in tubes and refrigerant surrounding tubes within shell. Shell is separate from evaporator.
- B. Shell Material: Carbon-steel rolled plates with continuously welded seams or seamless pipe.
- C. Designed to prevent direct impingement of high-velocity hot gas from compressor discharge on tubes.
- D. Provide condenser with sight glass or other form of positive visual verification of refrigerant charge and condition.
- E. Tubes:
1. Individually replaceable from either end and without damage to tube sheets and other tubes.
 2. Mechanically expanded into end sheets and physically attached to intermediate tube sheets.
 3. Material: Copper.
 4. Nominal OD: 3/4 inch.
 5. Minimum Wall Thickness: ~~0.025~~ 0.028 inch.
 6. External Finish: Manufacturer's standard.
 7. Internal Finish: Enhanced.
- F. End Tube Sheets: Continuously welded to each end of shell; drilled and reamed to accommodate tubes with positive dual seal between fluid in tubes and refrigerant in shell.
- G. Intermediate Tube Sheets: Installed in shell and spaced along length of tube at intervals required to eliminate vibration and to avoid contact of tubes resulting in abrasion and wear.
- H. Water Box:
1. Cast-iron or carbon-steel construction; arranged to provide visual inspection and cleaning of tubes from either end without disturbing refrigerant in shell.

2. Standard type for water box with piping connections. Standard type for water box without piping connections.
3. Provide water boxes with lifting lugs or eyebolts.
4. Nozzle Pipe Connections: Grooved for mechanical-joint coupling.
5. Thermistor or RTD temperature sensor factory installed in each nozzle.
6. Fit each water box with 3/4-inch drain connection at low point and vent connection at high point, each with threaded plug.

I. Additional Corrosion Protection:

1. Using same material as tubes, or **Belzona coating**, clad surfaces of end tube sheets in contact with fluid. Coat other wetted surfaces, including water boxes, with ~~a corrosion-resistant finish~~ **same material as tubes or Belzona coating.**

2.8 INSULATION

- A. Closed-cell, flexible elastomeric thermal insulation complying with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 1. Thickness: 3/4 inch .
- B. Adhesive: As recommended by insulation manufacturer.
- C. Factory-applied insulation over all cold surfaces of chiller capable of forming condensation. Components shall include, but not be limited to, evaporator shell and end tube sheets, evaporator water boxes including nozzles, refrigerant suction pipe from evaporator to compressor, cold surfaces of compressor, refrigerant-cooled motor, and auxiliary piping.
 1. Apply adhesive to 100 percent of insulation contact surface.
 2. Before insulating steel surfaces, prepare surfaces for paint, and prime and paint as indicated for other painted components. Do not insulate unpainted steel surfaces.
 3. Seal seams and joints to provide a vapor barrier.
 4. After adhesive has fully cured, paint exposed surfaces of insulation to match other painted parts.

2.9 ELECTRICAL

- A. Factory installed and wired, and functionally tested at factory before shipment.
- B. Single-point, field-power connection to **non**-fused disconnect switch. Minimum withstand rating shall be as required by electrical power distribution system, but not less than 65,000 A.
 1. Branch power circuit to each motor, electric heater, dedicated electrical load, and controls with disconnect switch.
 - a. NEMA KS 1, heavy-duty, fusible switch with rejection-type fuse clips rated for fuses. Select and size fuses to provide Type 2 protection according to IEC 60947-4-1.
 - b. NEMA AB 1, motor-circuit protector (circuit breaker) with field-adjustable, short-circuit-trip set point.
 2. NEMA ICS 2-rated motor controller for auxiliary motors, hand-off-auto switch, and overcurrent protection for each motor. Provide variable frequency controller for each variable-speed motor furnished.
 3. Control-circuit transformer with primary and secondary side fuses.
- C. Terminal blocks with numbered wiring to match wiring diagram. Spare wiring terminal block for connection to external controls or equipment.
- D. Factory-installed wiring outside of enclosures shall be in metal raceway except make terminal connections with not more than a 24-inch conduit.

2.10 VARIABLE FREQUENCY CONTROLLER

- A. Motor controller shall be factory mounted and wired on the chiller to provide a single-point, field-power termination to the chiller and its auxiliaries.
- B. Description: NEMA ICS 2; listed and labeled as a complete unit and arranged to provide variable speed by adjusting output voltage and frequency.
- C. Enclosure: Unit mounted, NEMA 250, Type 1, with hinged full-front access door with lock and key.
- D. Integral Disconnecting Means: NEMA AB 1, instantaneous-trip circuit breaker with lockable handle. Minimum withstanding rating shall be as required by electrical power distribution system, but not less than 65,000 A.
- E. Technology: Pulse width modulated (PWM) output with insulated gate bipolar transistors (IGBT); suitable for variable torque loads.
- F. Controller shall consist of a rectifier converter section, a digital/analog driver regulator section, and an inverter output section.
 - 1. Rectifier section shall be a full-wave diode bridge that changes fixed-voltage, fixed-frequency, ac line power to a fixed dc voltage. Silicon controller rectifiers, current source inverters, and paralleling of devices are unacceptable. Rectifier shall be insensitive to phase rotation of the ac line.
 - 2. Regulator shall provide full digital control of frequency and voltage.
 - 3. Inverter section shall change fixed dc voltage to variable-frequency, variable ac voltage, for application to a squirrel-cage motor. Inverter shall produce a sine-coded, pulse width modulated (PWM) output wave form and shall conduct no radio-frequency interference back to the input power supply.
- G. Output Rating: Three phase; with voltage proportional to frequency throughout voltage range.
- H. Operating Requirements:
 - 1. Input AC Voltage Tolerance: 460-V ac, plus 10 percent.
 - 2. Input frequency tolerance of 60 Hz, plus or minus 2 Hz.
 - 3. Capable of driving full load, without derating, under the following conditions:
 - a. Ambient Temperature: 0 to 50 deg C.
 - b. Relative Humidity: Up to 95 percent (noncondensing).
 - c. Altitude: 6,600 feet.
 - 4. Minimum Efficiency: 96 percent at 60 Hz, full load.
 - 5. Minimum Displacement Primary-Side Power Factor: 95 percent without harmonic filter, 98 percent with harmonic filter.
 - 6. Overload Capability: 1.05 times the full-load current for 7 seconds.
 - 7. Starting Torque: As required by compressor-drive assembly.
 - 8. Speed Regulation: Plus or minus 1 percent.
 - 9. Isolated control interface to allow controller to follow control signal over a 10:1 speed range.
 - 10. To avoid equipment resonant vibrations, provide critical speed lockout circuitry to allow bands of operating frequency at which controller shall not operate continuously.
 - 11. Capable of being restarted into a motor coasting in either the forward or reverse direction without tripping.
- I. Internal Adjustability Capabilities:
 - 1. Current Limit: 30 percent to a minimum of 100 percent of maximum rating.
- J. Self-Protection and Reliability Features: Subjecting the controller to any of the following conditions shall not result in component failure or the need for replacement:
 - 1. Overtemperature.
 - 2. Short circuit at controller output.
 - 3. Ground fault at controller output. Variable frequency controller shall be able to start a grounded motor.
 - 4. Open circuit at controller output.
 - 5. Input undervoltage.
 - 6. Input overvoltage.
 - 7. Loss of input phase.

8. Reverse phase.
 9. AC line switching transients.
 10. Instantaneous overload, line to line or line to ground.
 11. Sustained overload exceeding 100 percent of controller rated current.
 12. Starting a rotating motor.
- K. Motor Protection: Controller shall protect motor against overvoltage and undervoltage, phase loss, reverse phase, overcurrent, overtemperature, and ground fault.
- L. Automatic Reset and Restart: Capable of three restarts after controller fault or on return of power after an interruption and before shutting down for manual reset or fault correction. Controller shall be capable of automatic restart on phase-loss and overvoltage and undervoltage trips.
- M. Visual Indication: On face of controller enclosure or chiller control enclosure; indicating the following conditions:
1. Power on.
 2. Run.
 3. Overvoltage.
 4. Line fault.
 5. Overcurrent.
 6. External fault.
 7. Motor speed (percent).
 8. Fault or alarm status (code).
 9. DC-link voltage.
 10. Motor output voltage.
 11. Input kilovolt amperes.
 12. Total power factor.
 13. Input kilowatts.
 14. Input kilowatt-hours.
 15. Three-phase input voltage.
 16. Three-phase output voltage.
 17. Three-phase input current.
 18. Three-phase output current.
 19. Three-phase input voltage total harmonic distortion.
 20. Three-phase input current total harmonic distortion.
 21. Output frequency (Hertz).
 22. Elapsed operating time (hours).
 23. Diagnostic and service parameters.
- N. Operator Interface: At controller or chiller control panel; with start-stop and auto-manual selector with manual-speed-control potentiometer.
- O. Control Signal Interface:
4. Electric Input Signal Interface: ~~A minimum of two analog inputs (0 to 10 V or 0/4-20 mA) and six programmable digital inputs.~~ **BACnet MSRP, BACnet IP, or LonTalk.**
- P. Cooling: Refrigerant cooled.
- Q. Accessories: Devices shall be factory installed in controller enclosure unless otherwise indicated.
1. Control Relays: Auxiliary and adjustable time-delay relays.
- R. Chiller Capacity Control Interface: Equip chiller with adaptive control logic to automatically adjust the compressor motor speed and the compressor pre-rotation inlet vane position independently to achieve maximum part-load efficiency in response to sensor inputs that are integral to the chiller controls.
- 2.11 CONTROLS
- A. Control: Standalone and microprocessor based, with all memory stored in nonvolatile memory so that reprogramming is not required on loss of electrical power.

- B. Enclosure: Unit mounted, NEMA 250, Type 1, hinged or lockable; factory wired with a single-point, field-power connection and a separate control circuit.
- C. Operator Interface: Multiple-character digital or graphic display with dynamic update of information and with keypad or touch-sensitive display located on front of control enclosure. In either imperial or metric units selectable through the interface, display the following information:
1. Date and time.
 2. Operating or alarm status.
 3. Fault history with not less than last 10 faults displayed.
 4. Set points of controllable parameters.
 5. Trend data.
 6. Operating hours.
 7. Number of chiller starts.
 8. Outdoor-air temperature or space temperature if required for chilled-water reset.
 9. Entering- and leaving-fluid temperatures of evaporator and condenser.
 10. Difference in fluid temperatures of evaporator and condenser.
 11. Fluid flow of evaporator and condenser.
 12. Fluid pressure drop of evaporator and condenser.
 13. Refrigerant pressures in evaporator and condenser.
 14. Refrigerant saturation temperature in evaporator and condenser shell.
 15. Compressor refrigerant suction and discharge temperature.
 16. Compressor bearing temperature.
 17. Motor bearing temperature.
 18. Motor winding temperature.
 19. Phase current.
 20. Percent of motor rated load amperage.
 21. Phase voltage.
 22. Demand power (kilowatts).
 23. Energy use (kilowatt-hours).
 24. Power factor.
 25. For chillers equipped with variable frequency controllers and harmonic filters, include the following:
 - a. Output voltage and frequency.
 - b. Voltage total harmonic distortion for each phase.
 - c. Supply current total demand distortion for each phase.
 - d. Inlet vane position.
 - e. Controller internal ambient temperature.
 - f. Heatsink temperature.
- D. Control Functions:
1. Manual or automatic startup and shutdown time schedule.
 2. Entering and leaving chilled-water temperatures, control set points, and motor load limits. Evaporator fluid temperature shall be reset based on return-water temperature.
 3. Current limit and demand limit.
 4. Condenser-fluid temperature.
 5. External chiller emergency stop.
 6. Variable evaporator flow.
 7. Thermal storage.
 8. Heat reclaim.
- E. Manually Reset Safety Controls: The following conditions shall shut down chiller and require manual reset:
1. Low evaporator temperature; high condenser pressure.
 2. Low evaporator fluid temperature.
 3. High compressor-discharge temperature.
 4. Loss of condenser-fluid flow.
 5. Loss of evaporator fluid flow.
 6. Motor overcurrent.
 7. Motor overvoltage.
 8. Motor undervoltage.
 9. Motor phase reversal.
 10. Motor phase failure.
 11. Sensor- or detection-circuit fault.

12. Processor communication loss.
 13. Motor controller fault.
 14. Extended compressor surge.
- F. Trending: Capability to trend analog data of up to five parameters simultaneously over an adjustable period and frequency of polling.
- G. Security Access: Provide electronic security access to controls through identification and password with at least three levels of access: view only; view and operate; and view, operate, and service.
- H. Control Authority: At least four conditions: Off, local manual control at chiller, local automatic control at chiller, and automatic control through a remote source.
- I. Communication Port: RS-232 port, USB 2.0 port, or equivalent connection capable of connecting a printer.
- J. BAS Interface: Factory-installed hardware and software to enable the BAS to monitor, control, and display chiller status and alarms.
1. Hardwired Points:
 - a. Monitoring: On-off status, common trouble alarm, electrical power demand, electrical power consumption (kilowatt-hours), power factor.
 - b. Control: On-off operation, chilled-water, discharge temperature set-point adjustment, electrical power demand limit.
 2. ASHRAE 135 (BACnet or LonTalk or Modbus (coordinate with controls)) communication interface with the BAS shall enable the BAS operator to remotely control and monitor the chiller from an operator workstation. Control features and monitoring points displayed locally at chiller control panel shall be available through the BAS.

2.12 FINISH

- A. Paint chiller, using manufacturer's standard procedures, except comply with the following minimum requirements:
1. Provide at least one coat of primer with a total dry film thickness of at least 2 mils.
 2. Provide at least two coats of alkyd-modified, vinyl enamel finish with a total dry film thickness of at least 4 mils.
 3. Paint surfaces that are to be insulated before applying the insulation.
 4. Paint installed insulation to match adjacent uninsulated surfaces.
 5. Color of finish coat to be manufacturer's standard.
- B. Provide Owner with quart container of paint used in application of topcoat to use in touchup applications after Project Closeout.

2.13 ACCESSORIES

- A. Flow Switches:
1. Chiller manufacturer shall furnish a switch for each evaporator and condenser and verify field-mounting location before installation.
 2. Pressure Differential /**Thermal Dispersion** Switches:
 - a. Construction: Wetted parts of body and trim constructed of Type 316 stainless steel.
 - b. Performance: Switch shall withstand, without damage, the full-pressure rating of the heat exchanger applied to either port and exhibit zero set-point shift due to variation in working pressure.
 - c. Set Point: Screw type, field adjustable.
 - d. Electrical Connections: Internally mounted screw-type terminal blocks.
 - e. Switch Enclosure: NEMA 250, Type 4.
 - f. Switch Action: Double-pole, double-throw switch with one pole field wired to the chiller control panel and the other pole field wired to the BAS.
- B. Vibration Isolation:

1. Chiller manufacturer shall furnish vibration isolation for each chiller.
2. Neoprene Pad:
 - a. Two layers of 0.375-inch thick, ribbed- or waffle-pattern neoprene pads separated by a 16-gage, stainless-steel plate.
 - b. Provide stainless-steel square bearing plate to load the pad uniformly between 20 and 40 psig with a 0.12- to 0.16-inch deflection.

2.14 SOURCE QUALITY CONTROL

- A. Perform functional tests of chillers before shipping.
- B. Factory performance test chillers, before shipping, according to ARI 550/590.
 1. Test the following conditions:
 - a. ~~Design conditions indicated.~~ Design conditions with AHRI Relief at 100%, 75%, 50%, and 25% load.
 - b. Four (4) point ARI 550/590 non witness test.
 2. Prepare test report indicating test procedures, instrumentation, test conditions, and results. Submit copy of results within one week of test date.
- ~~C. Factory sound test chillers, before shipping, according to ARI 575.
 1. Test the following conditions:
 - a. Design conditions indicated.
 - b. Chiller operating at calculated worst case sound condition.
 - c. At the (4) ARI 550/590 performance point(s) of varying part load performance.
 2. Prepare test report indicating test procedures, instrumentation, test conditions, and results. Submit copy of results within one week of test date.~~
- D. For chillers using R-134a refrigerant, factory test and inspect evaporator according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- E. For chillers located indoors, rate sound power level according to ARI 575.

2.15 REFRIGERANT MONITORS

- A. Refrigerant monitors shall be provided in conformance to ASHRAE 15.
- B. The refrigerant monitors shall have an infrared sensor using either photo acoustic or photo absorptive sensing method. The minimum refrigerant detection level shall be no more than 1 ppm and its specified error over its measurement range shall be no more than +/- 3 ppm (1 - 50 ppm range), +/- 10% (51 - 1,000 ppm range).
- C. The monitor's specified performance shall be confirmed by a factory or jobsite test. This test shall be done with a NIST (National Institute of Standards and Technology) traceable mixture of the monitor's scheduled refrigerant. If done at the factory, the manufacturer shall provide a certificate of test/ verification with the unit. If done at the jobsite, the manufacturer's representative shall use 10 ppm refrigerant mixture to demonstrate that the refrigerant monitor has an error of no more than +/- 3 ppm at 10 ppm concentration.
- D. Monitors using infrared photo absorptive sensing shall have an auto-zero function using gas piped from outside the equipment room. The zero gas shall be filtered through a carbon filter having at least 1 ½ years capacity. Auto zero functions are not required for infra red photo acoustic monitors.
- E. Refrigerant monitors shall provide indication of sensed refrigerant concentration, preset alarm limits, alarm status, and alarm reset switch on the unit front panel. The unit shall have a 4 to 20 ma/ 0 to 10 vdc building automation system interface analog output that is proportional for a minimum of 0 to 1,000 ppm.
- F. The unit shall have a self-diagnosing fault alarm and three levels of refrigerant concentration alarm setpoints. There shall be a fault relay and 3 form C, SPDT 115 vac pilot duty alarm relays. The alarm relays shall be user selectable for latching and non-latching operation.

G. The monitors shall have a sample pump capable of 0.75 liter/minute sample with a maximum sample length of no less than 500 feet. The monitor shall have one sampling channel with a sample/particle filter(s) mounted between 12 and 18 inches off the floor at the sampling location.

H. Sample tubing shall be 1/8 inch ID copper tubing using flare connections. The use of soldered joints on copper tubing or the use of plastic tubing is not allowed.

I. An audible horn indicating fault or alarm shall be installed on the refrigerant monitor.

J. An alarm strobe light shall be installed on the refrigerant monitor. The light will operate upon audible alarm operation.

2.16 SELF CONTAINED BREATHING APPARATUS

A. One (1) Self-Contained Breathing Apparatus (SCBA) shall be provided as an OSHA approved re-entry device as required by ASHRAE Standard 15. The SCBA shall be of the type using compressed air and shall be jointly certified by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) under Subpart H, 30 CFR, Part II for 30 minute- rated service life. The apparatus shall be certified for use at temperatures above -25F.

B. The SCBA shall consist of the following parts: (1) A single lens faceplate with speaking diaphragm and detachable breathing tube. (2) Pressure demand regulator. (3) High pressure regulator. (4) Audible warning bell. (5) Compressed air tank. (6) Harness assembly. (7.) Wall mounted storage case with hinged door.

C. The SCBA mask faceplate shall be suitable for use with refrigerant. The faceplate material shall remain clear and not opaque when subjected to liquid refrigerant spray for 30 seconds. The mask shall have a built in speaking diaphragm with provision for a interconnection with a portable radio.

D. The SCBA tank shall be fabricated of aluminum construction and shall be 30 minute rated at 2216 psig. The tank shall include a tank harness including adjustable waist and shoulder straps.

E. The SCBA shall include all documentation needed to ensure compliance with OSHA training and maintenance requirements. This includes but is not limited to; Donning Chart, Warranty Card, Factory Flow Test, Results, Safety Precautions, Product Information Bulletin, Inspection and Maintenance Procedures, Parts List, Air Mask, Maintenance Check List Card, and Maintenance Check List Sheet.

F. The SCBA documentation shall include a operator training VHS video tape.

G. The SCBA shall be provided with a self-supporting fiberglass wall case. The case shall have the capacity to contain either one or two SCBA(s) as indicated in the schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine chillers before installation. Reject chillers that are damaged.
- B. Examine roughing-in for equipment support, anchor-bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting chiller performance, maintenance, and operations before equipment installation.
 - 1. Final chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CHILLER INSTALLATION

- A. Equipment Mounting: Install chiller on concrete bases using elastomeric pads. Comply with requirements for concrete bases specified in Division 03 Section Cast-in-Place Concrete. Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for the following:
 - 1. Minimum Deflection.
 - 2. Dowel rods.
 - 3. For supported equipment.
 - 4. Place and secure anchorage devices.
 - 5. Installation of anchor bolts.
- B. Maintain manufacturer's recommended clearances for service and maintenance.
- C. Charge chiller with refrigerant.
- D. Install separate devices furnished by manufacturer and not factory installed.

3.3 CONNECTIONS

- A. Comply with requirements for piping specified in Division 23 Section "Hydronic Piping" and Division 23 Section "Refrigerant Piping". Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to chiller to allow service and maintenance.
- C. Evaporator Fluid Connections: Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to evaporator outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, flow meter, and drain connection with valve. Make connections to chiller with a flange or mechanical coupling.
- D. Condenser-Fluid Connections: Connect to condenser inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to condenser outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, flow meter, and drain connection with valve. Make connections to chiller with a flange or mechanical coupling.
- E. Refrigerant Pressure Relief Device Connections: For chillers installed indoors, extend vent piping to the outdoors without valves or restrictions. Comply with ASHRAE 15. Connect to chiller pressure relief device with flexible connector and dirt leg with drain valve.
- F. Connect each chiller drain connection with a union and drain pipe, and extend pipe, full size of connection, to floor drain. Provide a shutoff valve at each connection.

3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Verify that refrigerant charge is sufficient and chiller has been leak tested.
 - 3. Verify that pumps are installed and functional.
 - 4. Verify that thermometers and gages are installed.
 - 5. Operate chiller for run-in period.
 - 6. Verify that refrigerant pressure relief device is vented outside.
 - 7. Verify proper motor rotation.
 - 8. Verify static deflection of vibration isolators, including deflection during chiller startup and shutdown.
 - 9. Verify and record performance of fluid flow and low-temperature interlocks for evaporator and condenser.
 - 10. Verify and record performance of chiller protection devices.

11. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
- B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assembly, installation, and connection.
- C. Prepare test and inspection startup reports.

3.5 DEMONSTRATION

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

END OF SECTION 236416

THIS PAGE INTENTIONALLY BLANK