P R O J E C T M A N U A L

COUNTY OF FRESNO
CRISIS RESIDENTIAL TREATMENT FACILITY (CRT)
496 SOUTH BARTON AVENUE
FRESNO, CA 93702

Pre-bid conference: Wednesday, November 2, 2016 – 3:00 p.m.
Bid Date: Thursday, November 17, 2016 – 2:00 p.m.

A pre-bid conference will be held on ***Wednesday, November 2, 2016*** **at** ***3:00*** **PM**. A discussion of the project will be held and the project site will be available for examination. Contractors should meet at ***Kings Canyon Campus in Parking Lot K located west of South Barton Avenue and south of Huntington Boulevard***.

Department of Public Works and Planning

CONTRACT NO. 16-S-05 **COPY NO.**

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ADDENDUM NO. 1 CONTRACT NO. 16-S-05

PROJECT

Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

Dated: 11-7-2016



Nov. 8, 2016
Date Signed

Capital Projects Division Manager: _____
Stuart G. Seiden, #C18719
Lic. Expiration: 03/31/17

Fresno County Department of Public Works and Planning
2220 Tulare Street, 8TH Floor
Fresno, CA 93721-2104



11-7-16
Date Signed

Architect of Record: _____
Robert C. Siegrist, #C9651,
Lic. Expiration: 10/31/17

Dyson Siegrist Janzen Architects, Inc.
1295 N. Wishon Avenue, Suite #101
Fresno, CA 93728

The foregoing documents are amended in the respects as herein set forth. This addendum and the amendments herein shall become part of said documents and of any contract entered into pursuant to said documents.

PLEASE ACKNOWLEDGE THIS ADDENDUM ON PROPOSAL PAGE - 2 OF THE PROJECT MANUAL. IF YOU HAVE GIVEN THE CONTRACT DOCUMENTS TO SOMEONE ELSE, PLEASE FORWARD THIS ADDENDUM.

A. BID FORMS AND CONTRACT CONDITIONS:

No Changes

B. SPECIFICATIONS:

1. Section 03 30 00 Cast-In-Place Concrete

   a. Under Part 2.02 Item D 1. Acceptable Products, add Viper Vaporcheck II15-Mil “Class A” Vapor Barrier

2. Section 07 41 13 Metal Roof Panels

   b. Metal Sales Manufacturing Corporation “Magna Loc” panel is approved as an alternative provided the performance, quality and finish matches the specified.

3. Section 10 28 00 Toilet Room Accessories

   a. Add the following to Part 2.01 Item B2: i:
   American Specialties, Inc. (ASI)

   b. Revise Part 3.04 Item B1a(1) to read:
   At Unisex Toilet <10> and <20> only.

   c. Add the following to Part 3.04: Item B2.:
   Single Toilet Tissue Dispenser, Surface Mounted, Häfele model no. 988.96.700 at all Shower Rooms <28>, <30>, <37>, <39>, <46>, <55>, <57> and Accessible Bathroom <48>.

4. Section 28 31 00 Fire Detection and Alarm

   a. Add the following to Part 2.1: Basis-of-Design Product to be Gamewell-FCI, Honeywell Fire Systems.

   b. Delete Part 2.1 Item A.1. “NO SUBSTITUTION”

C. DRAWINGS:

1. Sheet A-000 Cover Sheet

   a. Under “Deferred Approval – Fire Sprinklers, add the following note:

Refer to 2013 NFPA 13; FFD Policy 405.19.

2. Sheet A-001 Finish Schedule & Wall Types

   a. Add the following to Finish Schedule Note 11 :
   All decorative materials shall be non-combustible or shall be made from California State Fire Marshal approved flame retardant treated materials. CCR Title19, Section 3.08.

   b. Add the following note to Wall Assembly Types- Interior Walls, Item 2d:
   Terminate at 4" above F.F. with aluminum plaster stop (J-bead) with ¼" return.

3. Sheet A-002 Door Schedules

   a. Under Frame Elevation <C> H.M. Double Door Louver note, delete "See Mechanical drawings" and replace with the following note:
   Provide min. 14 ga. g.i. sheet metal louvers in 4" min. deep frame w/ ¼" grid bird screen to be installed integral w/ door frame and prime coated for paint finish.

4. Sheet A-003 Window Elevations

   a. Window Elevation <28>: Revise jamb detail callout on the left side to 23/A-802. Add horizontal dimension as 2'-7 ¼".

   b. Window Elevation <29>: Add jamb detail callout on the right side to 23/A-802.

5. Sheet A-101 Site Plan

   a. Revise Keynote 20: Revise model number from SHB-BEE-SF(IG) to SHB-SUN-SF(IG).

   b. Revise Keynote 40 to read: Drain inlet, see Civil dwgs. Attach roof drain chain to grate per detail 12/A-804.

6. Sheet A-201 Dimensioned Floor Plan

   a. Add General Notes D-4: Include lettering not less than 0.5 inch in height, incorporating the suggested wording: "FIRE AND/OR SMOKE BARRIER-PROTECT ALL OEPNINGS", or similar wording approved by Fire Marshall.

7. Sheet A-202 Noted Floor Plan

   a. Add to Note 33: Install in recessed cabinet.

   b. Add 2 additional 2A:10B:C fire extinguishers (total of 4) in the following

locations: One in Exercise Room <22> non-rated wall near door 26, one in Admin Office <17> north wall, one in Hall <16> chase wall near drinking fountain. Delete <7> Employee Break Room extinguisher in Floor Plan. Extinguisher in <25> Corridor (1 hr rated) to remain. See AD-A01.

c. Add Tactile Directional Exit Sign (directional) at south end of Corridor<25>. Add Tactile Exit Sign at Door <26>. See AD-A01.

8. Sheet A-301 Details

a. Add 2 illuminated exit signs per AD-A02.

b. Add keynote 18 per AD-A02 for aluminum channel to support illuminated exit signs above doors 01, 04 and 05.

c. Revise ceiling height at Mechanical Room <64> and Electrical Room <65> to Sloped. Eliminate ceiling framing in Structural sheets. Apply gyp. bd. directly below roof joist.

9. Sheet A-401 Roof Plan

a. Add Detail cut 5/A-803 and 4/A-803 per AD-03.

10. Sheet A-701 Sections

a. Revise Keynote 56 to read “Link or weld S.S. snap hook w/ eyelet to bottom of drain chain to hook to cast iron drain inlet grate.” See detail AD-A10.

b. Remove Keynote 57.

c. Revise roof slope in Sections A and B to read 1 1/2:12. Revise cricket slope in Section D to read 1/2:12.

11. Sheet A-802 Details

a. Revise Detail 12 - Jamb @ Brake Metal per AD–A04.

b. Add Detail 23 – Corner Brake Metal per AD-A05.

c. Add Detail 24-Aluminum Channel @ Storefront and keynotes 47, 48 and 49 per AD-A06.

12. Sheet A-803 Details

a. Add Detail 4 -Window Flashing @ Roof per AD-A07.

b. Revise Detail 5 per AD-A08.

c. Revise Detail 13 per AD-A09.

13. Sheet A-804 Details

    a. Add Detail 13 –Chain to Grate Attachment and add keynotes 40, 41 and 42 per AD-A10.

14. Sheet L-101 Planting Plan

    a. Remove additional existing trees by Barton Street and south of proposed building, and remove planters by the parking lot on the west and south side of the property and near Barton Street. Add vegetation and tree in an additional existing planter on south side of the parking lot. See revised sheet.

15. Sheet L-102 Irrigation Plan

    a. Revise irrigation to match revised vegetation and tree locations per revised sheet.

16. Sheet L-103 Landscape Construction Details

    a. Revise quantity of plant per attached revised sheet.

D. GENERAL CLARIFICATIONS

See attached Structural, Mechanical, Electrical and Civil Addendum items and revised drawings.

PARRISH HANSEN INCORPORATED
STRUCTURAL ENGINEERS

October 31, 2016

Attention: Mayuko
To: DSJ Architects

RE: Addendum #1
Project: Fresno County CRT

ADDENDUM #1 - Structural Items

Drawing AD-S01: Added circular window framing within typical framed opening.

Drawing AD-S02: Partial Roof Framing Plan. Added 2- B5 "struts" and revised beam connection to 10/S-602.

Drawing AD-S03: Partial Roof Framing Plan. Added fascia splice detail reference 6/S-603. Identified beam B6. Added Simpson hanger at end of B6.

Drawing AD-S04: Revised Detail 14/S-602 to clarify beam over wall. Added beam hangers. Clarified post below.

Drawing AD-S05: Added Detail 1/AD-S05 for thickened slab construction at the embedded rail slot for the folding wall between Rooms 22 & 23.

ROBERT S. PARRISH, S.E. JAMES R.A. HANSEN, S.E.
418 CLOVIS AVENUE • CLOVIS, CALIFORNIA 93612 • PHONE 559.323.1023 • FAX 559.323.8090

MDC

MECHANICAL DESIGN CONCEPTS, INC.

1060 W. Sierra, Suite 101
Fresno, CA 93711
Phone: (559) 437-0376
Fax: (559) 437-0297

Stephen A. Becker, P.E.
Michael D. Cantelmi, P.E.

November 1, 2016

15037

Mayuko Russell
DSJ Architects
1295 N. Wishon Avenue
Fresno, CA 93728

Project: Crisis Residential Treatment Facility

Dear Ms. Russell:

Please issue the following items in your next published addendum for this project:

PLUMBING DRAWINGS

1. Refer to Sheet P-203: The fire sprinkler riser located in the Mechanical Room requires an alarm bell. The bell is to be located on the street side (front) of the building. Refer to architectural drawings for location and to electrical drawings for wiring.

2. Refer to Sheet P-203: At the Reading Room, extend the floor cleanout to the west exterior – just west of the west wall.

MECHANICAL DRAWINGS

1. Refer to Sheet M-501: Both Package Air Conditioning units shall have supply air smoke detectors.

2. Refer to Sheet M-201: All Mode Control Units (MCU's) are to be supported per Detail G/M-301.

SPECIFICATIONS

1. Section 21 05 00 – Fire Sprinkler System: At paragraph 2.3 – all sprinkler heads in areas with finished ceilings shall be concealed drop-down type with white concealing plate.

Sincerely,

Stephen A. Becker, P.E.

HARDIN-DAVIDSON ENGINEERING

356 Pollasky Ave. • Suite 200 • Clovis, CA 93612
559.323.4995 tel • 559.323.4928 fax

Date: November 1, 2016

To: **DSJ Architects**
1295 N. Wishon Ave.
Fresno, CA 93728

Re: **Fresno County Crisis Residential Treatment Facility**
Addendum #1

Please issue the following items by addendum:

Reference sheet E-201

1. Add 1" conduit from the Post Indicator Valve (PIV) to the FACP. Assume 250 ft. linear distance for bidding purpose.

Reference sheet E-301

1. Add (6) exit signs and refer to sheet A-301 for locations.
2. Install exit signs at Entry and Lounge over doors in suspended metal channel system specified by architect; end feed power from junction box at side wall.

Reference sheet E-302

1. Add 15 amp 120V circuit to Won-Door. Install all components per manufacturer drawings, including key switch, limit switches, drive motor, etc.
2. Add 15 amp 120V dedicated fire alarm circuit to fire sprinkler riser bell. The circuit breaker shall have a red lock-on device installed.

Reference sheet E-401

1. Revise symbol "Smoke Detector, Photoelectric" to read "Advanced Multi-Criteria Fire/CO detector, Addressable". All smoke detectors shall be changed to combination smoke and carbon monoxide detectors.
2. Note that fire alarm plans are "For Reference Only". The contractor shall produce their own plans and obtain approval from the Fresno Fire Prevention Bureau.

Reference sheet E-402

1. Add (4) addressable relays and connect to HVAC shutdown terminals at (2) HC units and (2) ERV units supplying greater than 2000 CFM. Add 3/4" conduit from each unit to

accessible attic space for cabling. Program the units to shut down upon activation of the buildings “total coverage” fire alarm system.

2. Add (1) addressable relay and connect to Won-Door.
3. Add (2) addressable fire/co detectors, one on each side of Won-Door.
4. Add (1) addressable monitor module and connect to PIV on site.
5. Relocate the fire riser bell around the corner to the street side of the building.
6. Note that fire alarm plans are “For Reference Only”. The contractor shall produce their own plans and obtain approval from the Fresno Fire Prevention Bureau.

End of addendum items.

Please contact our office with any questions or concerns.

Regards,



Scott Davidson, P.E.

Blair, Church & Flynn
CONSULTING ENGINEERS

William Cardinal, E.I.T., Assistant Engineer • wcardinal@bcf-engr.com
451 Clovis Ave, Suite 200 • Clovis CA 93612 • Tel (559) 326-1400

November 1st, 2016
File No.215-0279

Bob Siegrist
DSJ Architects
1295 N Wishon Ave, Suite #101
Fresno CA 93728

Subject: Crisis Residential Treatment Facility
Civil Bid Addendum 1

Bob,

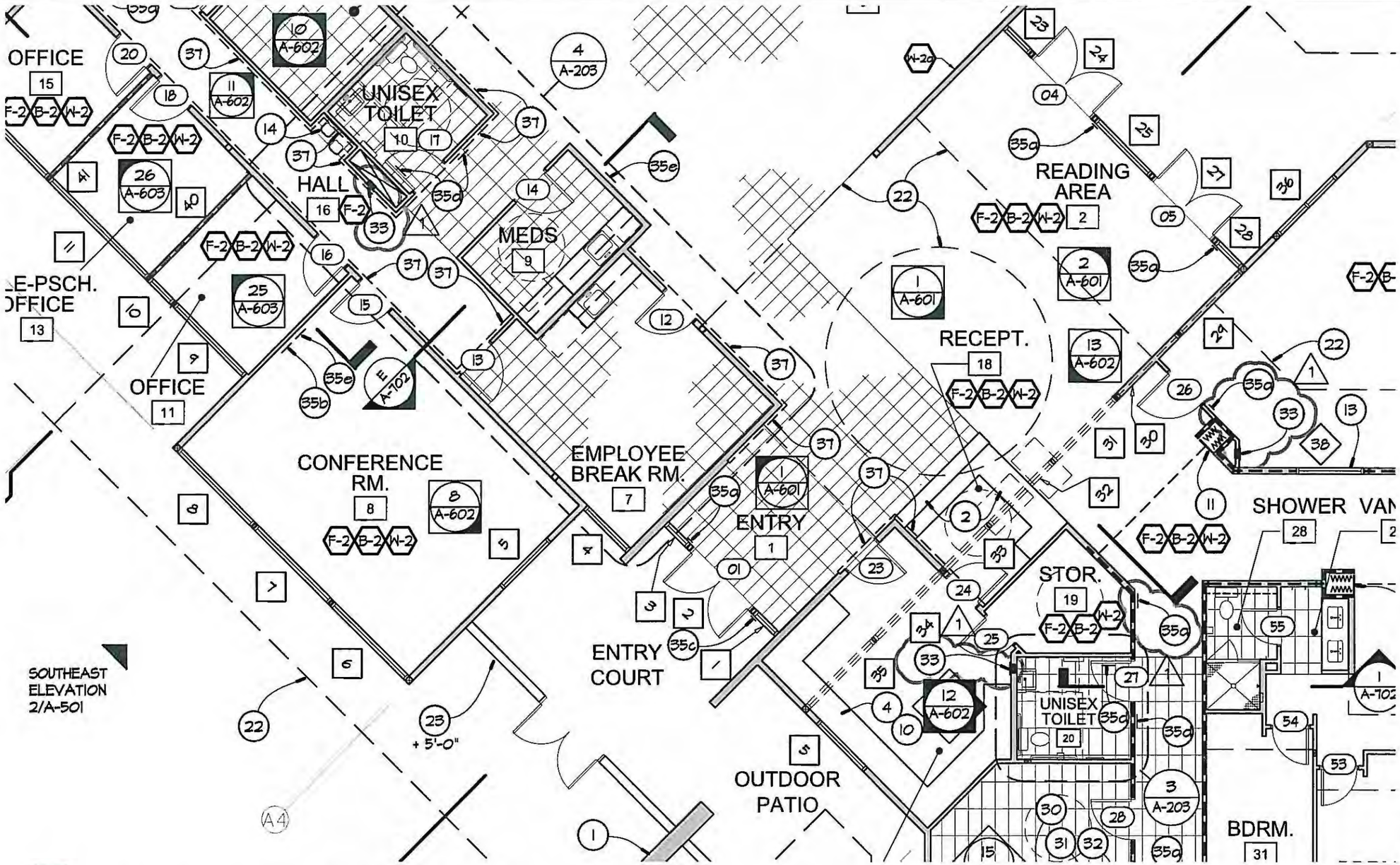
The following items are descriptions of the changes to the Bid Set for the Crisis Residential Treatment Facility.

1. Sheet C-101
    a. Added approximately 1,822 square feet of vegetation removal.
    b. Trees shown to be removed along Barton shall now be protected in place.
2. Sheet C-301 Grading and Drainage Plan
    a. Install (2) V-12 Storm Drain Inlets.
    b. Install 92 linear feet of 4" SDR-35 Storm Drain Pipe.
3. Sheet C-401 Utility Plan
    a. Remove (1) Fire Department Connection
    b. Install (1) Post Indicator Valve.

BLAIR, CHURCH & FLYNN CONSULTING ENGINEERS

William Cardinal, E.I.T.
Assistant Engineer

Attachments



NOTED FLOOR PLAN

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

LICENSED ARCHITECT ROBERT C. SIEGRIST C-9651 REN 10-31-17 STATE OF CALIFORNIA

REFERENCE SHEET: A-202

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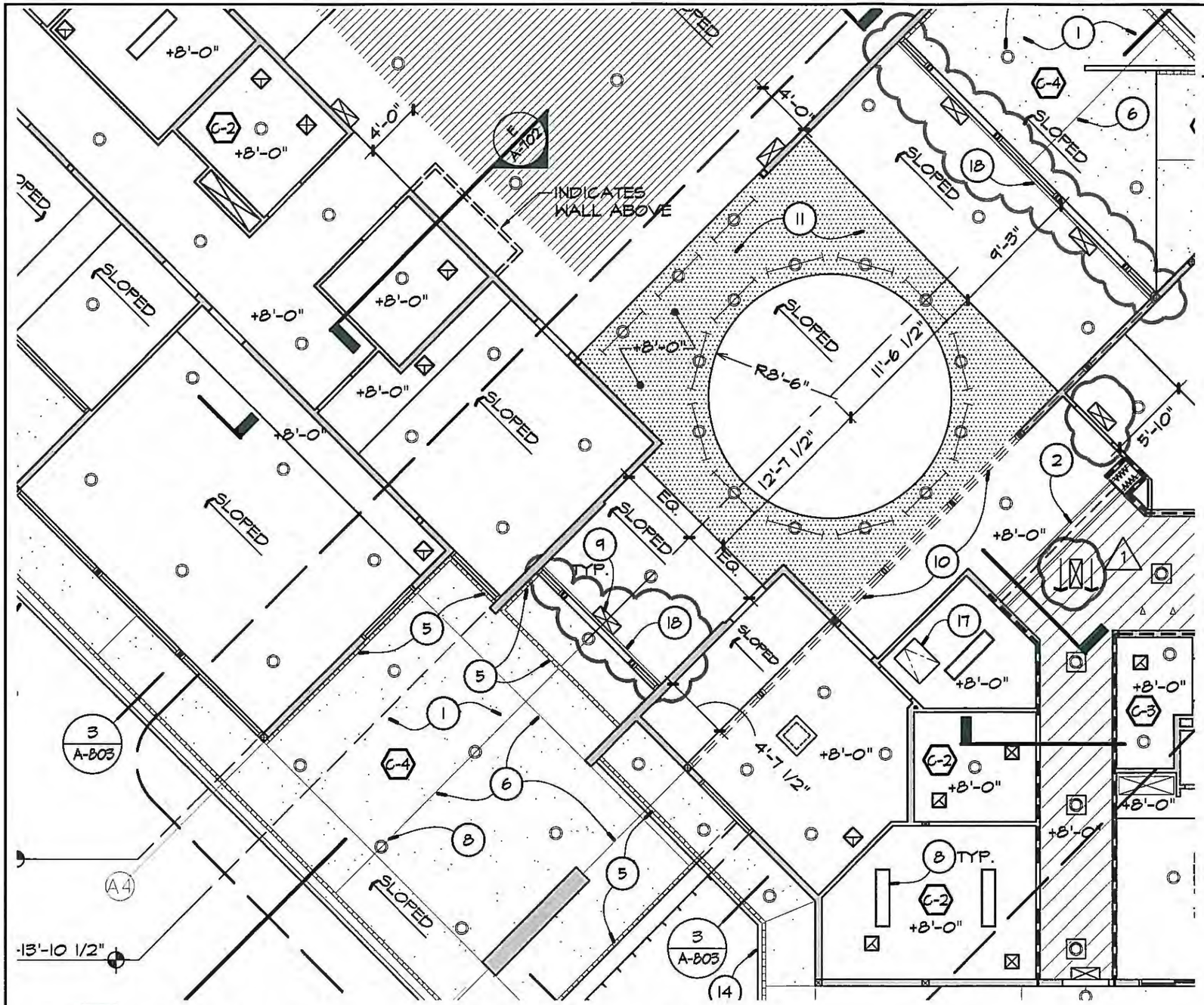
County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-A01

DATE: 11/02/16



KEYNOTES

(X) SYMBOL ON PLAN:

18. 4 1/2" H x 1 1/2" W x 1/8" THK ALUMINUM CHANNEL (JULIUS BLUM & CO. 800-526-6293) FOR MOUNTING AND WIRING ILLUMINATED EXIT SIGNS. SPAN THE ENTIRE LENGTH OF THE WALL BETWEEN ADJACENT WALLS. SEE DETAIL 24/A-802.

NORTH

REFLECTED CEILING PLAN

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

LICENSED ARCHITECT
ROBERT C. SIEGRIST
C-9651
REN. 10-31-17
STATE OF CALIFORNIA

REFERENCE SHEET: A-301

DYSON SIEGRIST JANZEN D.S.J. ARCHITECTS

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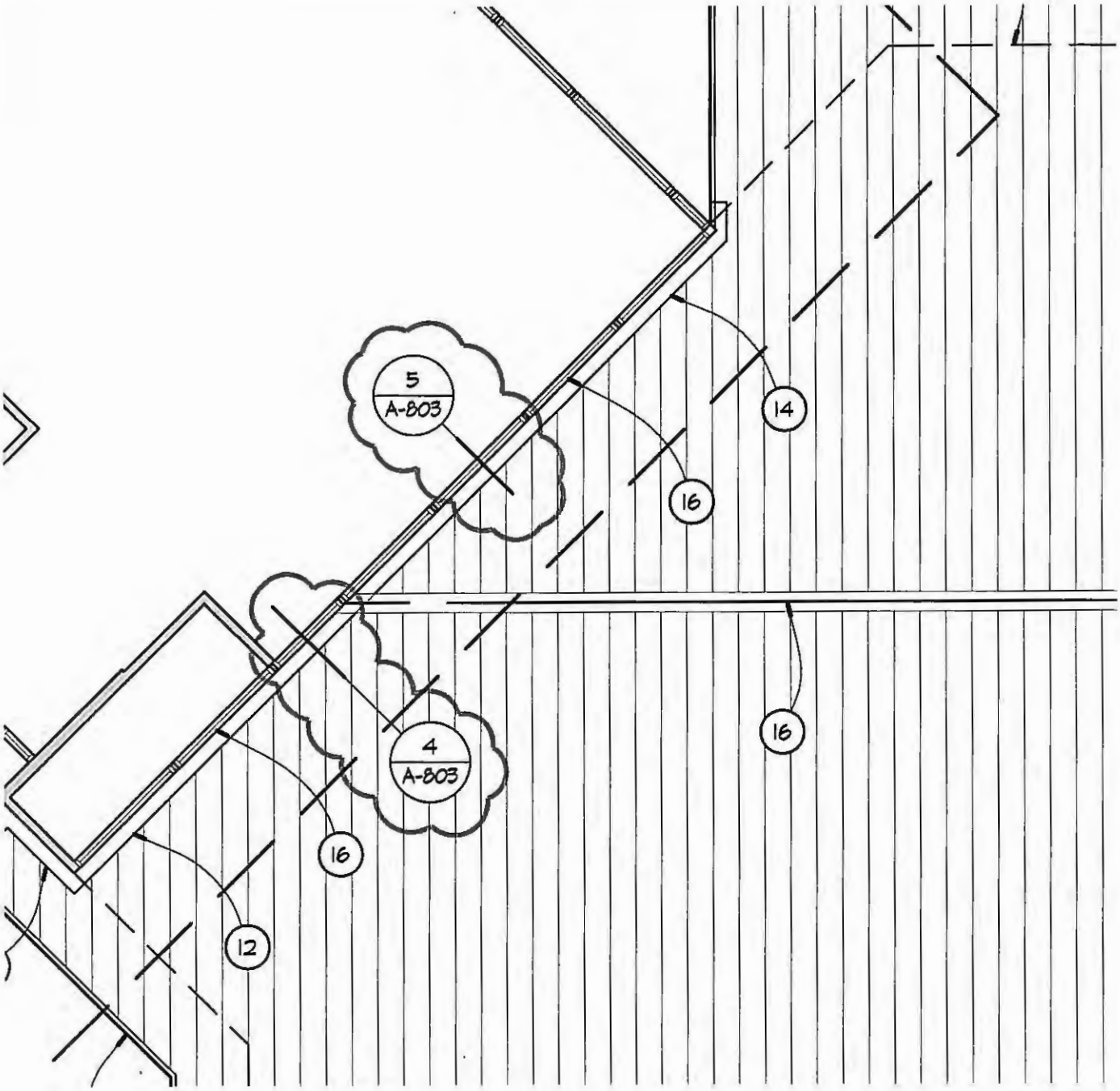
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ADDENDUM DRAWING

AD-02

DATE: 11/02/16



NORTH

ROOF PLAN

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

LICENSED ARCHITECT
ROBERT C. SIEGRIST
C-9651
REN 10-31-17
STATE OF CALIFORNIA

REFERENCE SHEET: A-401

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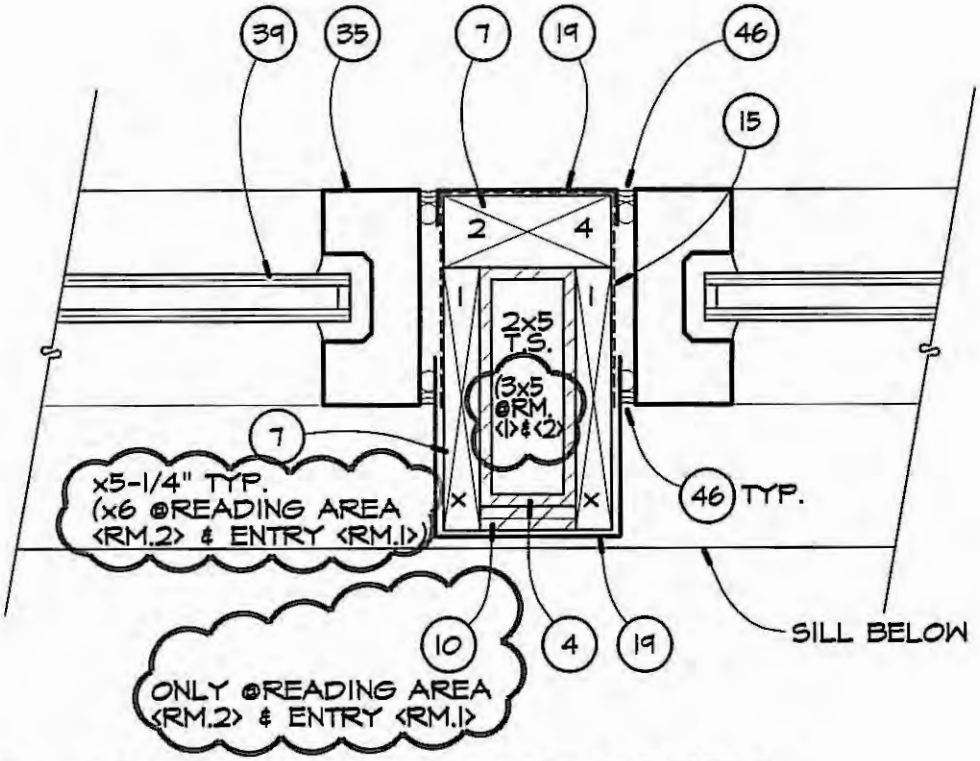
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ADDENDUM DRAWING

AD-A03

DATE: 11/02/16



12 JAMB @ BRAKE METAL

3"=1'-0"

LICENSED ARCHITECT
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REFERENCE SHEET: A-802

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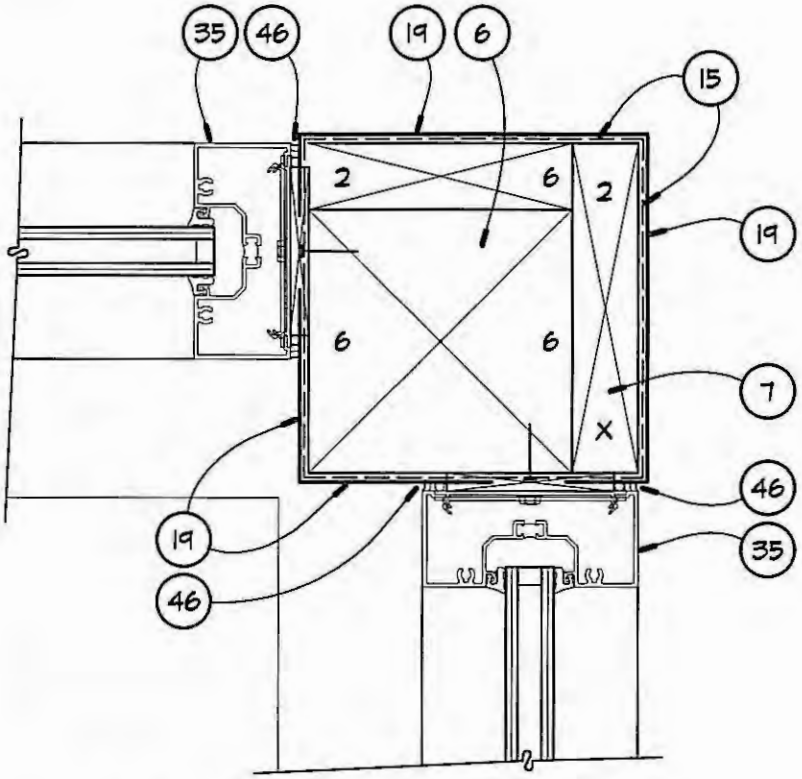
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ADDENDUM DRAWING

AD-A04

DATE: 11/02/16



23 CORNER BRAKE METAL DETAIL

3"=1'-0"



REFERENCE SHEET: A-802

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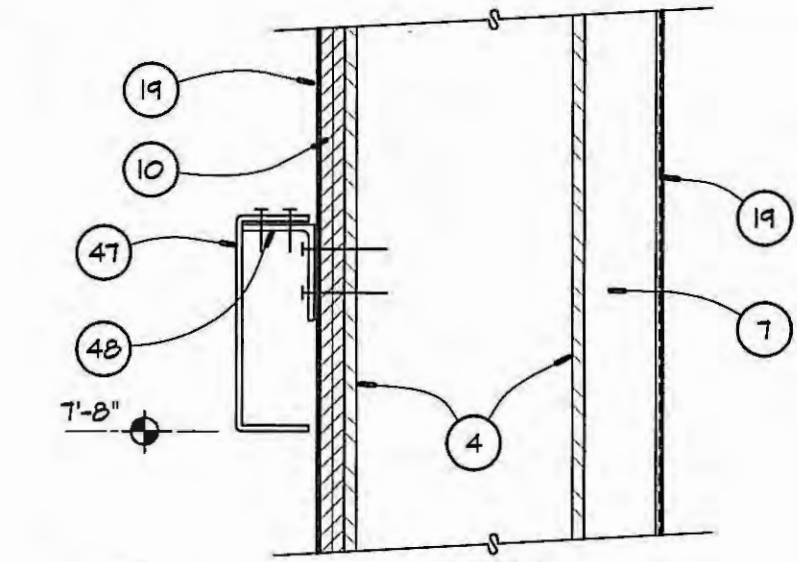
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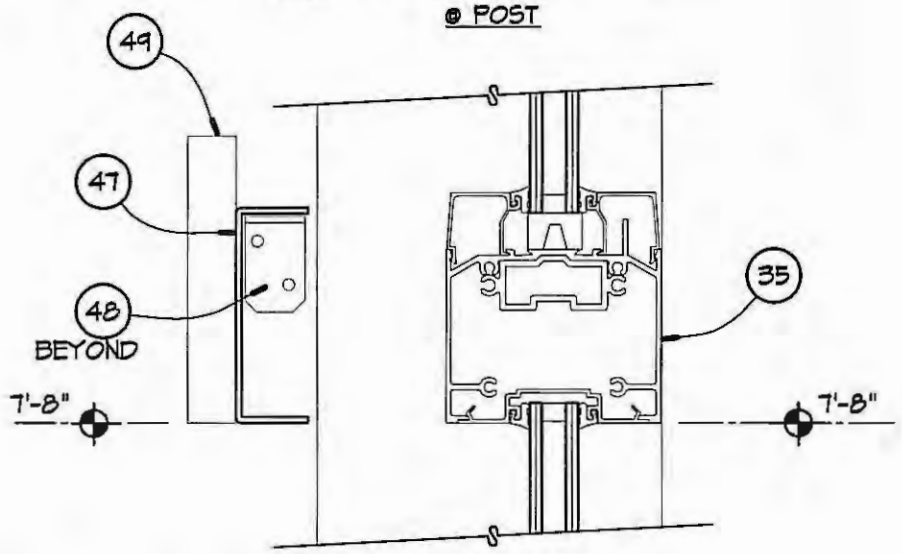
ADDENDUM DRAWING

AD-A05

DATE: 11/02/16



@ POST



@ STOREFRONT

47. 4 1/2" H x 1 1/2" W x 1/8" THK ALUMINUM CHANNEL (JULIUS BLUM & CO. 800-526-6293) FOR MOUNTING AND WIRING ILLUMINATED EXIT SIGNS. SPAN THE ENTIRE LENGTH OF THE WALL BETWEEN ADJACENT WALLS. SEE DETAIL 12/A-804.

48. SIMPSONS A21 2" x 1 1/2"ANGLE. (2) PER POST AND (1) AT EACH END. ATTACH ALUMINUM CHANNEL TO ANGLE WITH (2) 1/2" #10 S.M.S. ATTACH ANGLE TO STEEL POST WITH (2) 2" #10 M.S.

49. ILLUMINATED EXIT SIGN.

24 ALUMINUM CHANNEL @ STOREFRONT

3" = 1'-0"

LICENSED ARCHITECT
ROBERT C. SIEGRIST
C-9651
REN. 10-31-17
STATE OF CALIFORNIA

REFERENCE SHEET: A-802

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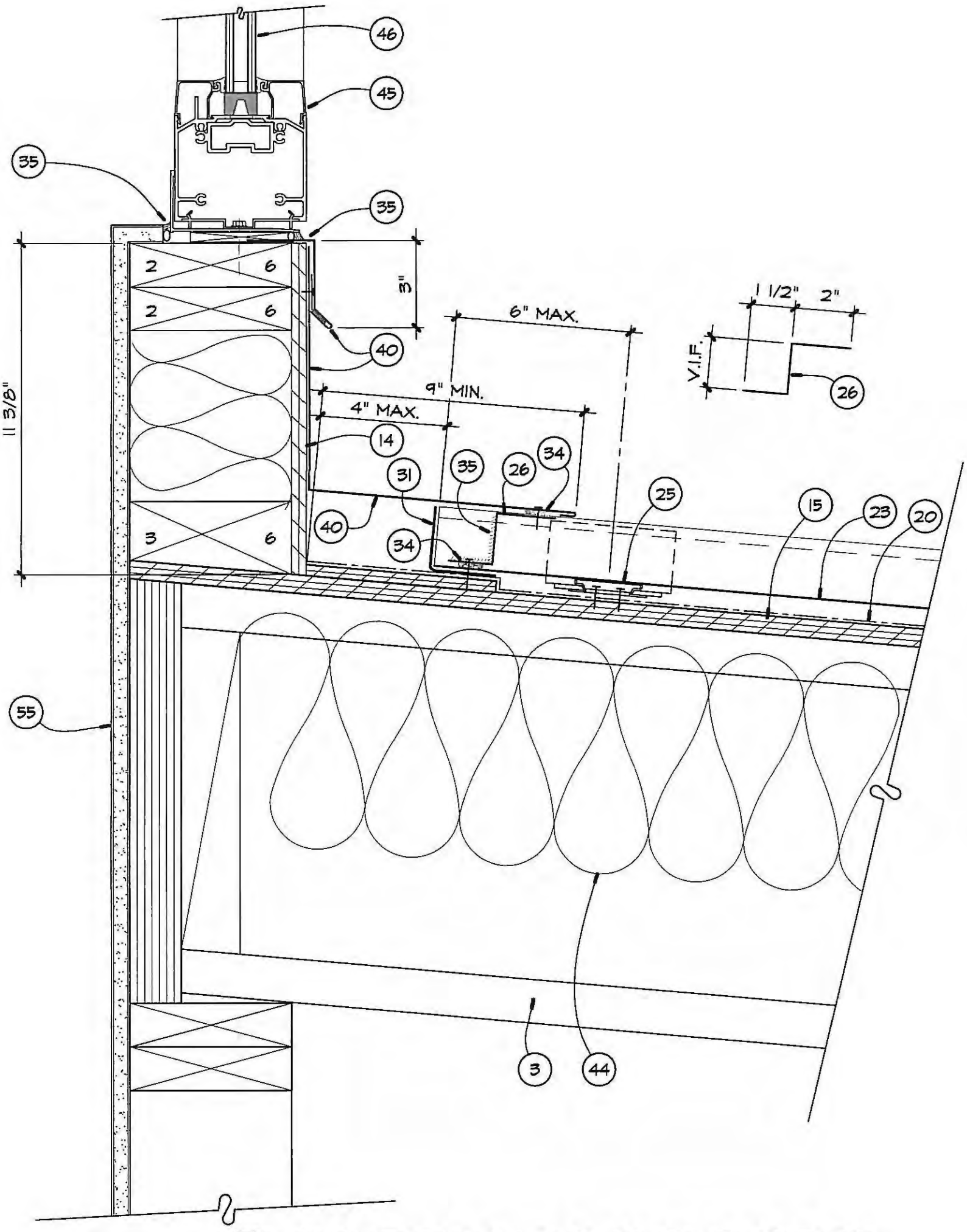
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ADDENDUM DRAWING

AD-A06

DATE: 11/02/16



4 WINDOW FLASHING @ ROOF

3"-0 = 1'-0"

SEE SHEET A-803 FOR KEYNOTES

LICENSED ARCHITECT
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REN. 10-31-17
STATE OF CALIFORNIA

REFERENCE SHEET: A-803

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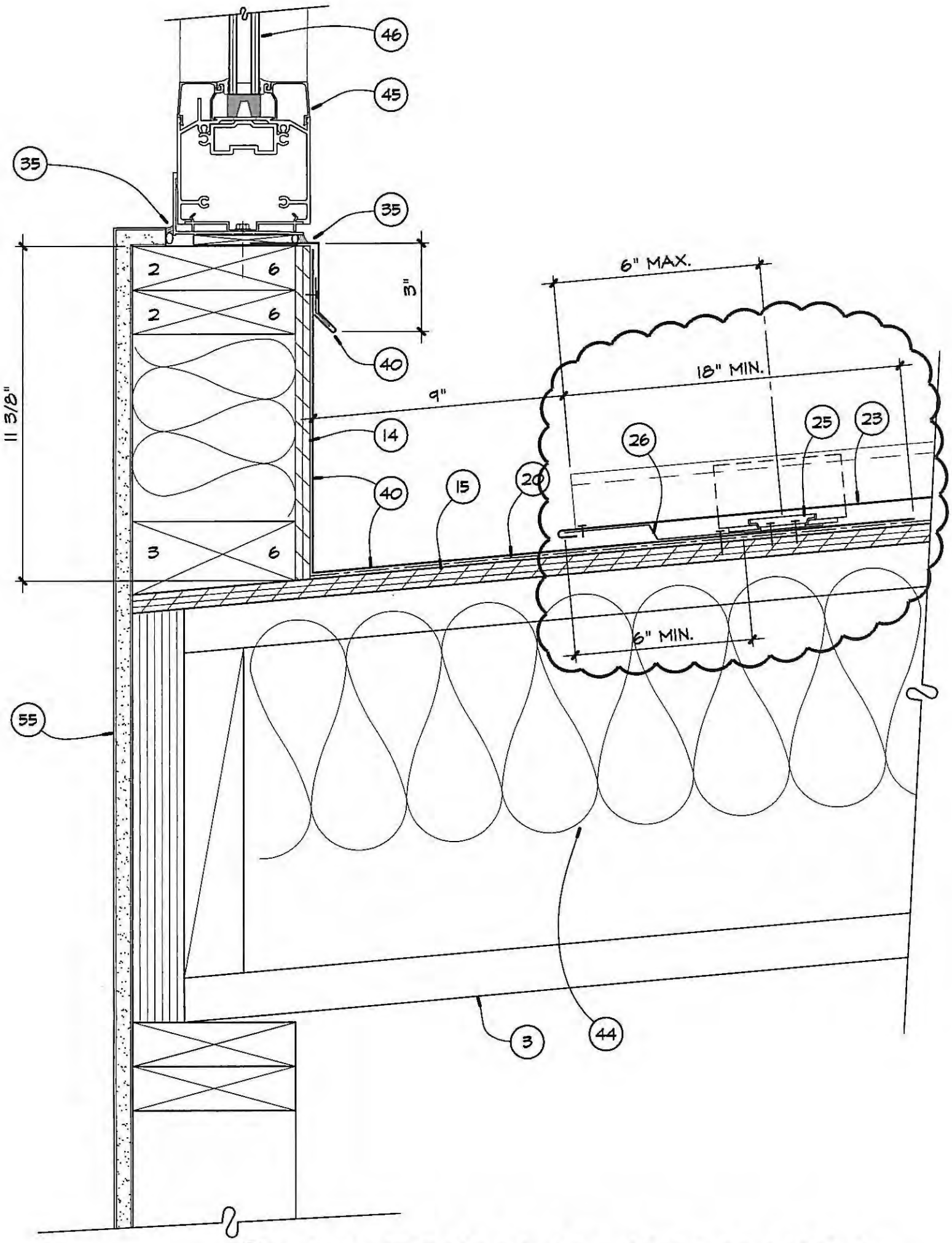
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ADDENDUM DRAWING

AD-A07

DATE: 11/02/16



5 WINDOW FLASHING @ ROOF

3"-0 = 1'-0"

LICENSED ARCHITECT
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STATE OF CALIFORNIA

REFERENCE SHEET: A-803

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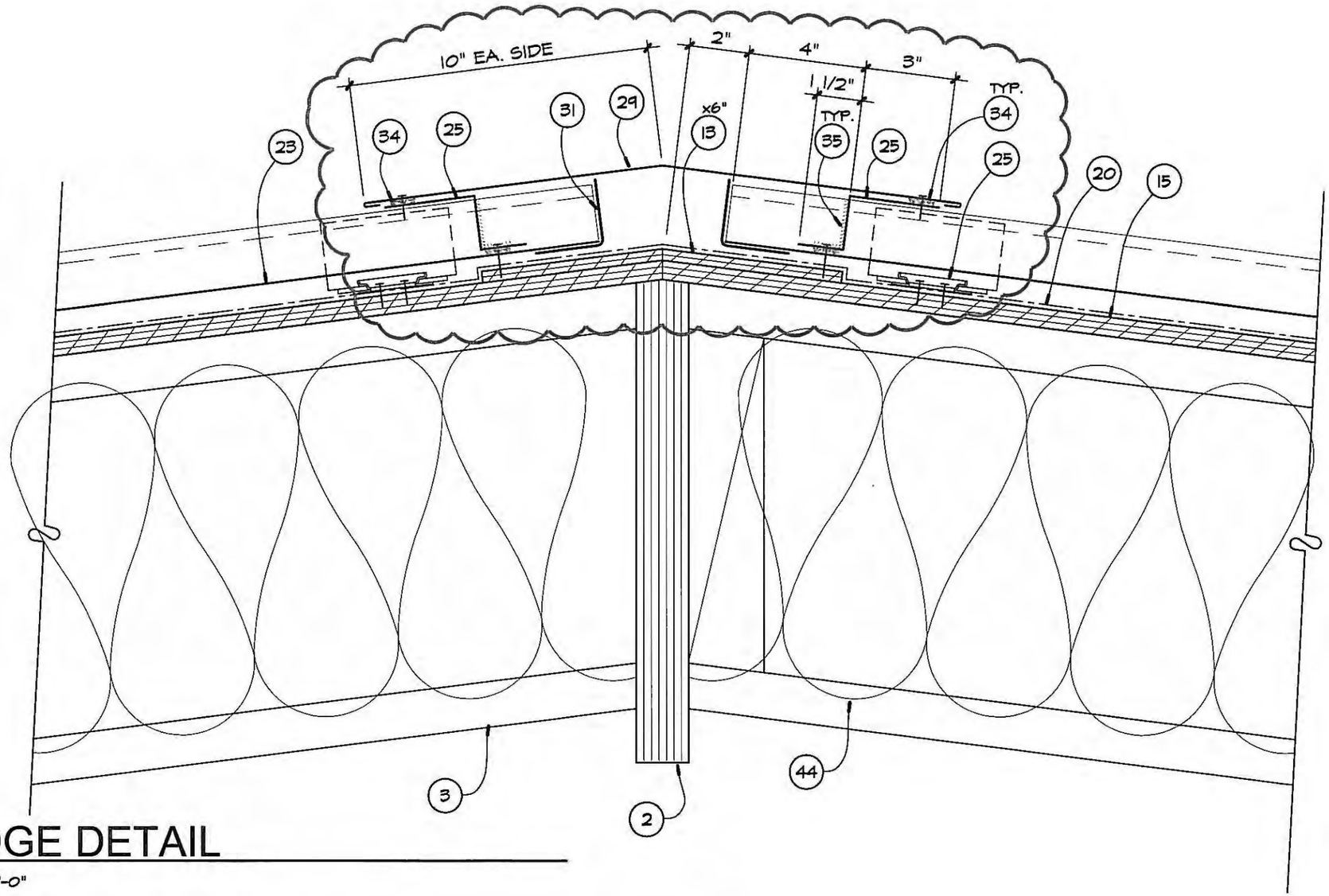
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496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-A08

DATE: 11/02/16



13 RIDGE DETAIL

3"-0 = 1'-0"

SEE SHEET A-803 FOR KEYNOTES

LICENSED ARCHITECT
ROBERT C. SIEGRIST
C-9651
REN. 10-31-17
STATE OF CALIFORNIA

REFERENCE SHEET: A-803

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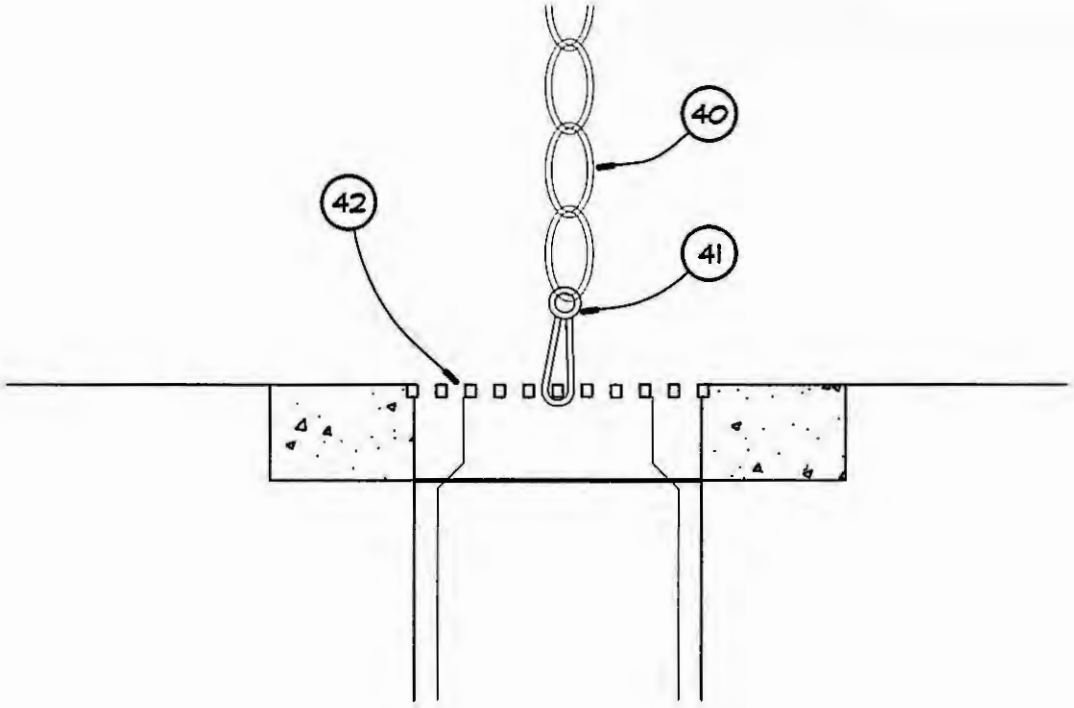
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496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-A09

DATE:11/02/16



12 CHAIN TO GRATE ATTACHMENT

1 1/2"=1'-0"

KEYNOTES SYMBOL ON DETAILS: (#)

40. 1-1/2" OPEN LINK S.S. DRAIN CHAIN.

41. S.S. SNAP HOOK WITH EYELET.

42. CAST IRON GRATE PER CIVIL DWGS.

LICENSED ARCHITECT
ROBERT C. SIEGRIST
C-9651
REN. 10-31-17
STATE OF CALIFORNIA

REFERENCE SHEET: A-804

DYSON SIEGRIST JANZEN
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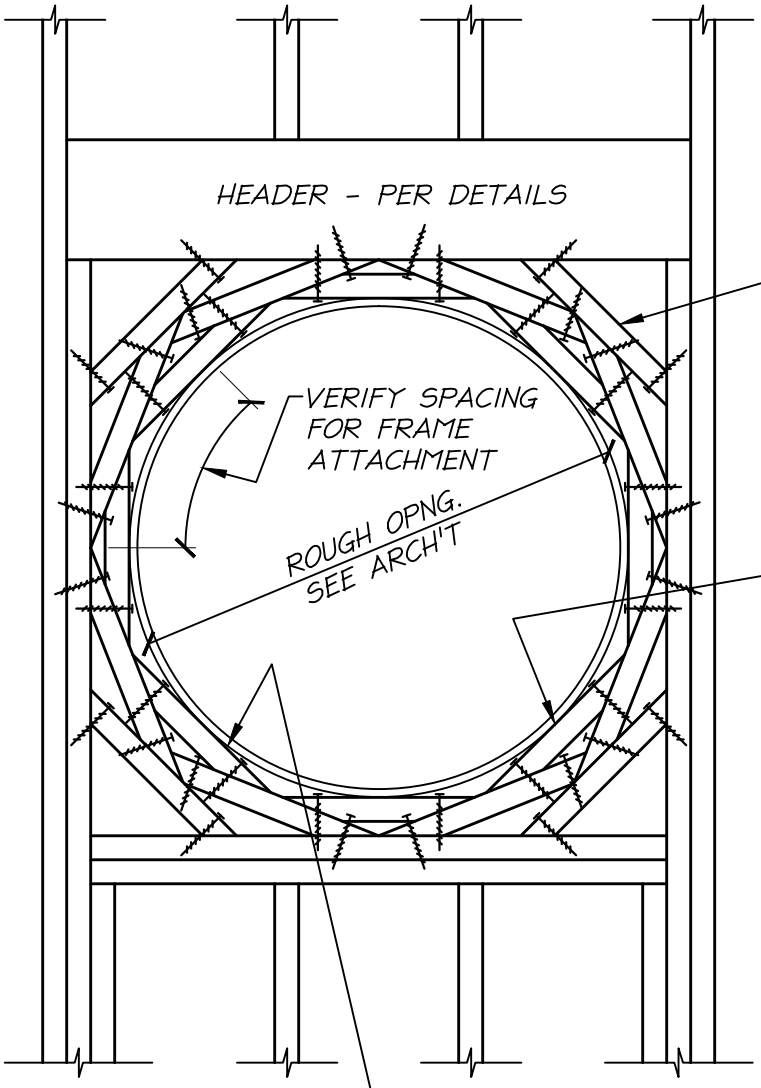
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Crisis Residential Treatment Facility

498 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-A10

DATE: 11/02/16



TYPICAL CIRCULAR WINDOW FRAMING
SEE ARCHITECT FOR LOCATIONS

DETAIL

1
AD-S01

SCALE: 1" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
ROBERT S. PARRISH
No. S2331
Exp. 3/17
10/31/16
STRUCTURAL
STATE OF CALIFORNIA

PARRISH HANSEN INCORPORATED
STRUCTURAL ENGINEERS
418 Clovis Ave. ■ Clovis CA. 93612
Phone 559.323.1023 ■ Fax 559.323.8090
www.parrish-hansen.com

REF: ADDENDUM #1

Dyson Siegrist Janzen Architects, Inc.
1295 N. Wishon Ave.
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Fax 559.486.4909
Web: dsjarchitects.com

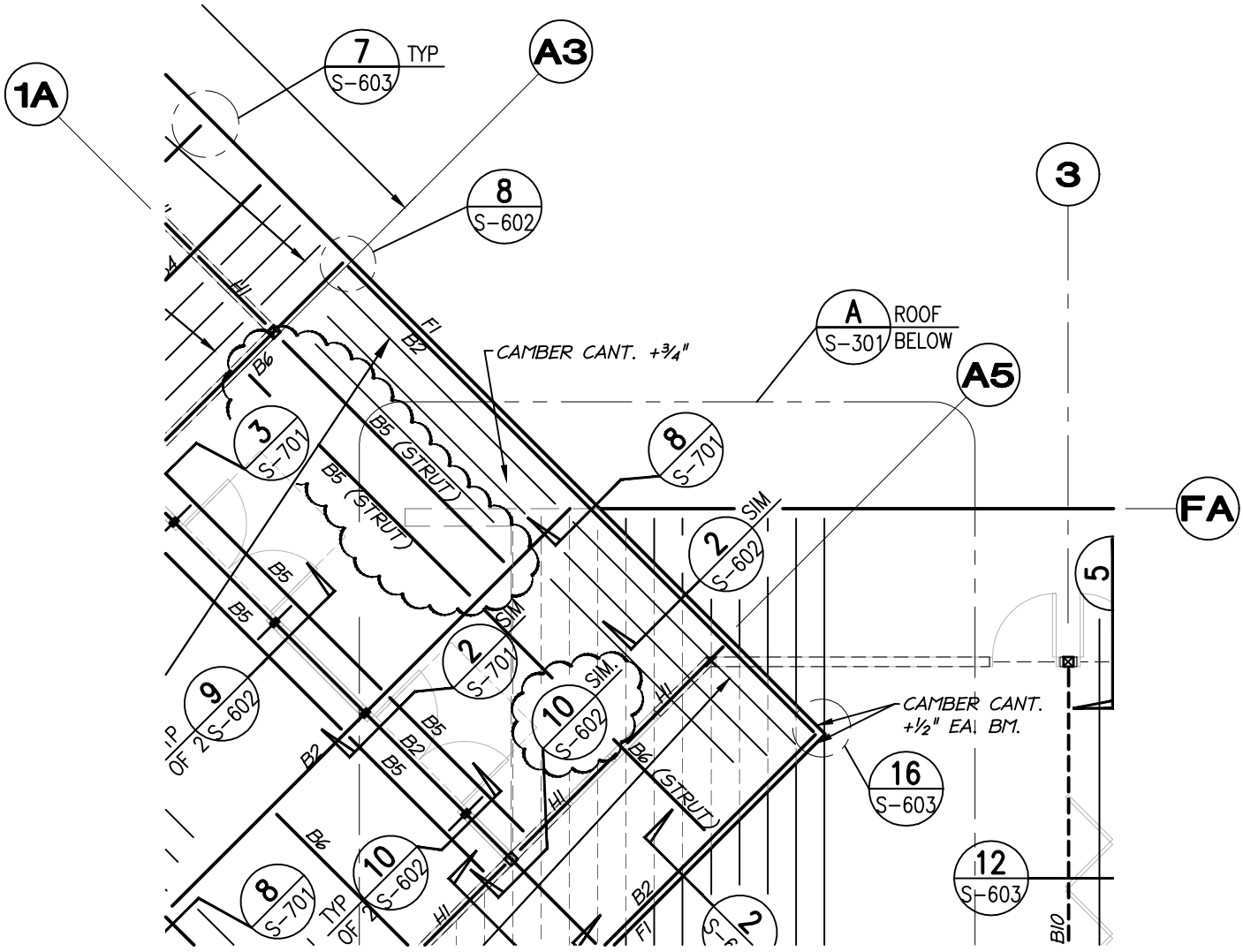
County of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno
Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-S01

DATE:10/31/16



ROOF FRAMING PLAN (PARTIAL)

1 AD-S02

SCALE: ⅛" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
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www.parrish-hansen.com

REF: ADDENDUM #1

NOTE: CLOUDED ITEMS INDICATE REVISED OR CLARIFIED CONDITIONS FROM PREVIOUSLY APPROVED SUBMITTALS.

REFERENCE SHEET: S-401

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County of Fresno
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Fresno, CA 93721

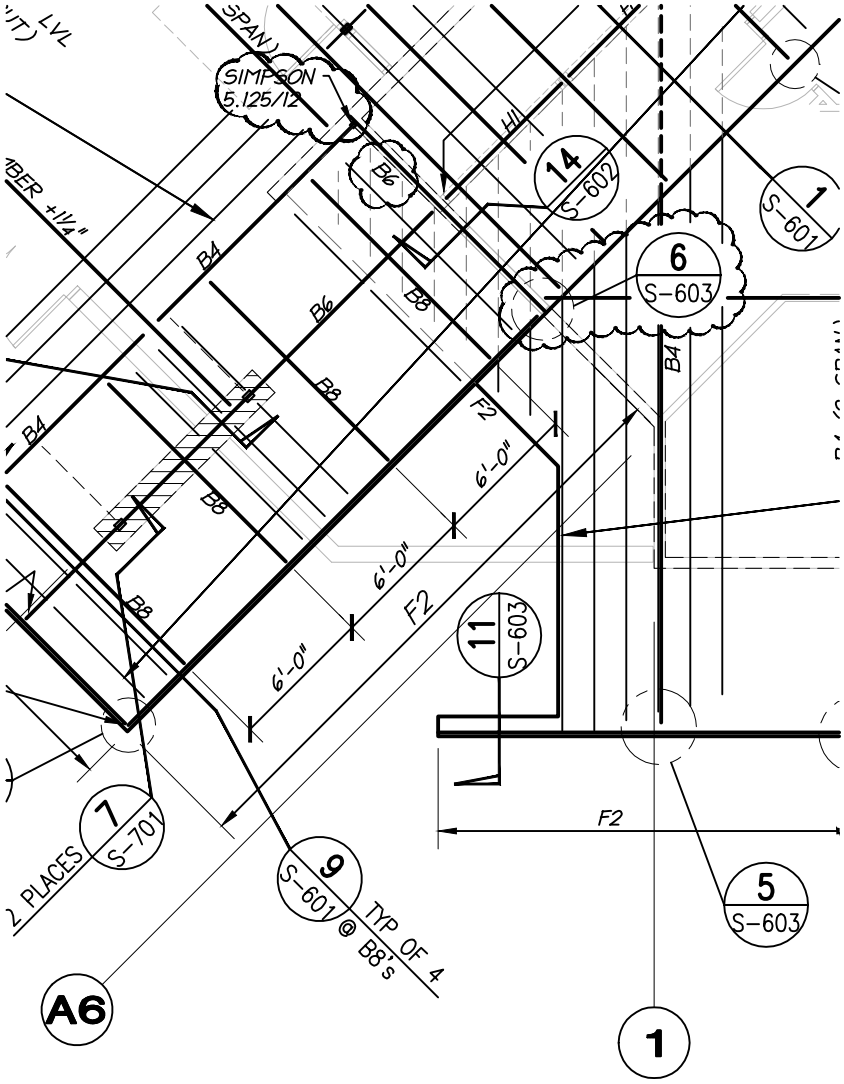
County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-S02

DATE: 10/31/16



ROOF FRAMING PLAN (PARTIAL)

1 / AD-S03

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

REGISTERED PROFESSIONAL ENGINEER
ROBERT S. PARRISH
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Exp. 3/17
10/31/16
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STATE OF CALIFORNIA

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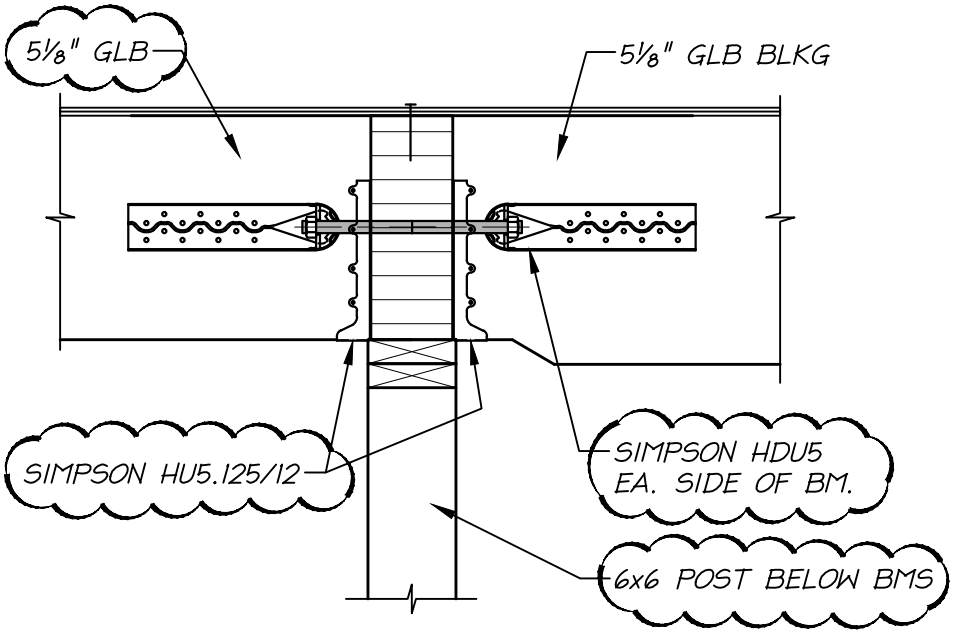
County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-S03

DATE: 10/31/16



DETAIL

14
RRF15 S-602

SCALE: 1" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
ROBERT S. PARRISH
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Exp. 3/17
10/31/16
STRUCTURAL
STATE OF CALIFORNIA

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REFERENCE SHEET: S-602

REF: ADDENDUM #1

NOTE: CLOUDED ITEMS INDICATE REVISED OR CLARIFIED CONDITIONS FROM PREVIOUSLY APPROVED SUBMITTALS.

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County of Fresno
2281 Tulare Street
Fresno, CA 93721

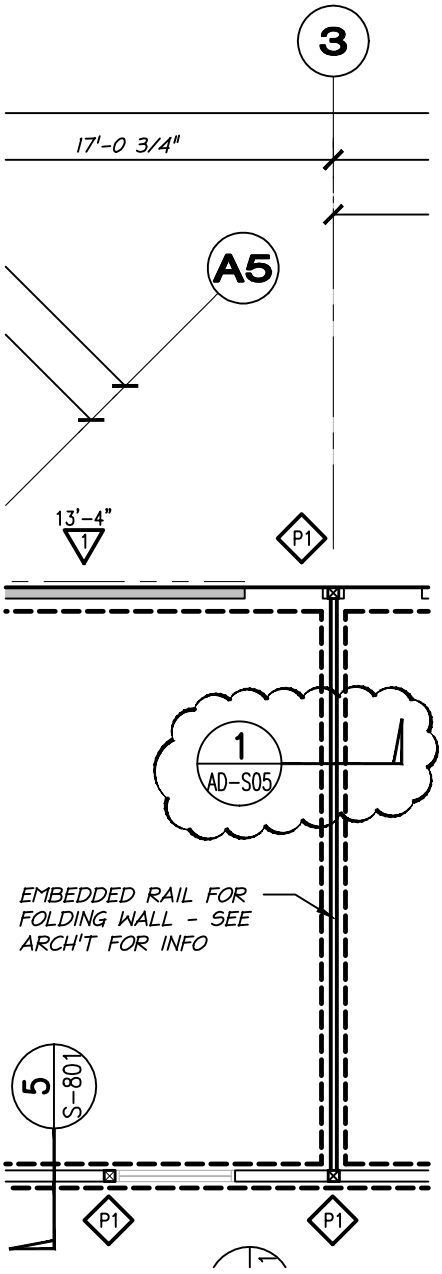
County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

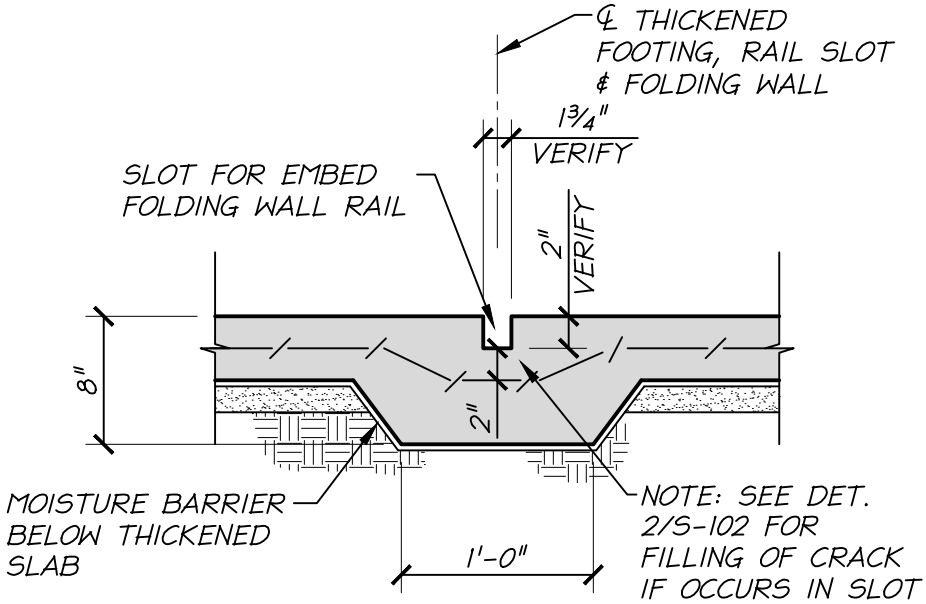
ADDENDUM DRAWING

AD-S04

DATE: 10/31/16



PARTIAL FOUNDATION PLAN



DETAIL

1
AD-S05

SCALE: 1" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
ROBERT S. PARRISH
No. S2331
Exp. 3/17
10/31/16
STRUCTURAL
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REF: ADDENDUM #1

NOTE: CLOUDED ITEMS INDICATE REVISED OR CLARIFIED CONDITIONS FROM PREVIOUSLY APPROVED SUBMITTALS.

REFERENCE SHEET: S-201

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County of Fresno
2281 Tulare Street
Fresno, CA 93721

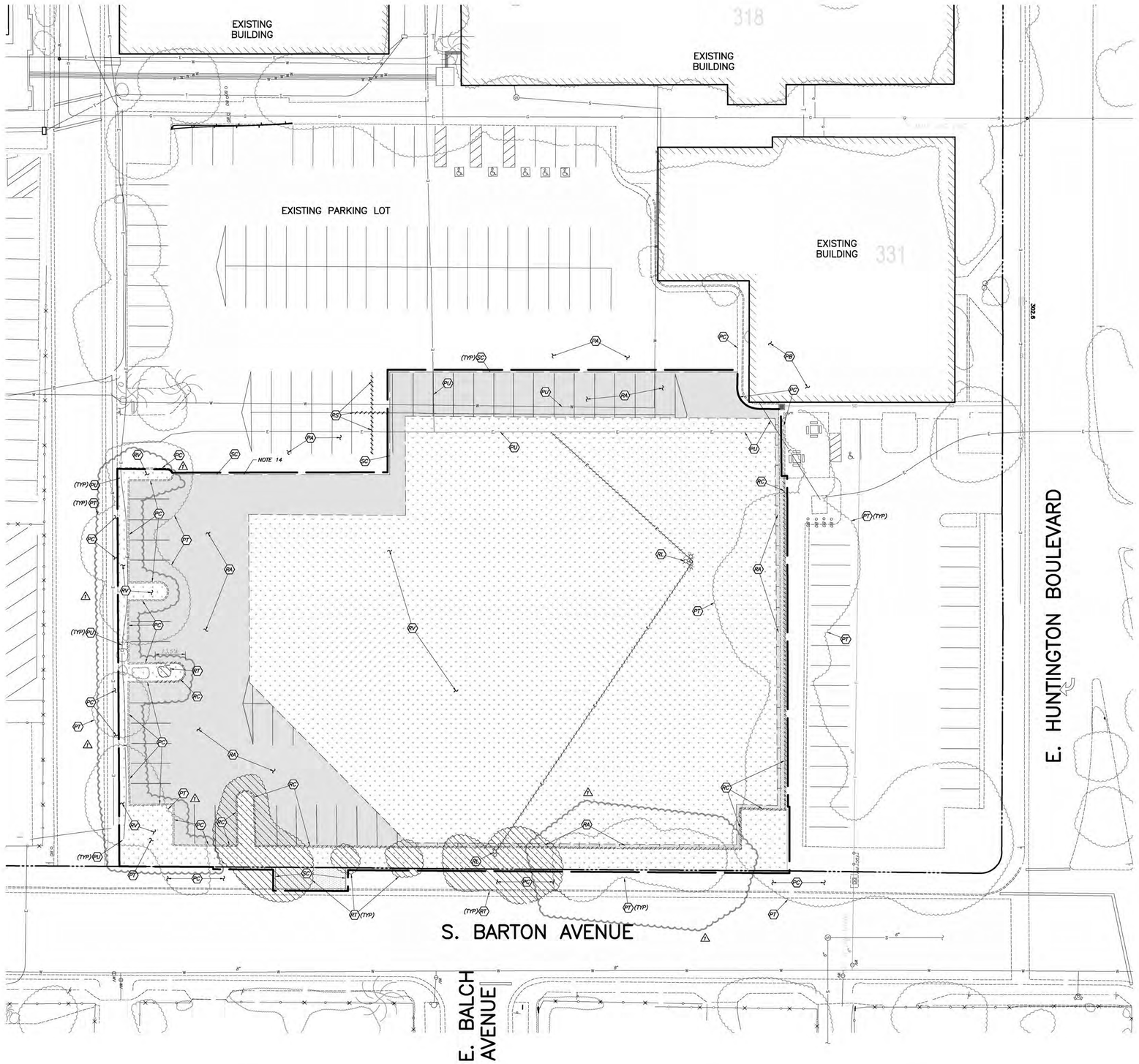
County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-S05

DATE:10/31/16



DEMOLITION LEGEND:

- APPROXIMATE LIMIT OF ONSITE DEMOLITION
- APPROXIMATE LIMIT OF VEGETATION REMOVAL
- APPROXIMATE LIMIT OF PAVEMENT REMOVAL
- APPROXIMATE LIMIT OF CONCRETE REMOVAL
- TREE AND ROOTS TO BE REMOVED
- APPROXIMATE OUTLINE OF TREE CANOPY
- (PA) PROTECT ASPHALT TO REMAIN
- (PB) PROTECT BUILDING TO REMAIN
- (PC) PROTECT CONCRETE TO REMAIN
- (PT) PROTECT TREE TO REMAIN
- (PU) PROTECT UTILITY TO REMAIN
- (RC) REMOVE CONCRETE IMPROVEMENT
- (RL) REMOVE LIGHTPOLE AND FOUNDATION. SALVAGE POLE TO OWNER.
- (RS) REMOVE STRIPE BY GRINDING OR SANDBLASTING
- (RT) REMOVE TREE TO BOTTOM OF ROOT BALL
- (RA) REMOVE ASPHALT PAVEMENT STRUCTURAL SECTION
- (RV) REMOVE VEGETATION
- (SC) SAWCUT
- APPROXIMATE LIMITS OF CONCRETE REMOVAL
- LIMIT OF PAVEMENT STRIPE REMOVAL
- LIMITS OF ELECTRICAL LINE REMOVAL

DEMOLITION NOTES:

1. THE COMPLETE SITE SHALL BE STRIPPED OF ALL ORGANIC MATTER TO A MINIMUM DEPTH OF 4".
2. CONTRACTOR SHALL LEGALLY DISPOSE OF ALL DEMOLISHED MATERIALS OFF SITE.
3. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITY IMPROVEMENTS TO REMAIN.
4. THE ON-SITE UNDERGROUND UTILITIES SHOWN ON THIS SHEET ARE AT AN APPROXIMATE LOCATION, LOCATED BY COUNTY PERSONNEL. THE EXTENT, LOCATIONS AND SIZES ARE UNKNOWN. THE CONTRACTOR SHALL VERIFY THE UNDERGROUND UTILITY LINES PRIOR TO REMOVAL.
5. CONTRACTOR TO PROTECT AND PRESERVE IN PLACE ANY FOUND SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE RESET BY A LICENSED SURVEYOR AND THE APPROPRIATE PAPERWORK FILED WITH THE CITY OR COUNTY.
6. ALL HAZARDOUS MATERIALS ENCOUNTERED DURING SITE AND BUILDING DEMOLITION SHALL BE REMEDIATED AND DISPOSED OF PER STATE AND EPA REQUIREMENTS.
7. CONTRACTOR SHALL CONTACT AND COORDINATE WITH ALL UTILITY AGENCIES PRIOR TO THE START OF ANY DEMOLITION OR CONSTRUCTION.
8. REMOVE EXISTING IMPROVEMENTS AS NECESSARY TO CONSTRUCT NEW IMPROVEMENTS SHOWN IN PLANS THE BUILDING PLAN SET. THE REMOVAL OF IMPROVEMENTS MUST BE COORDINATED WITH ALL PLAN SHEETS. CONTRACTOR MUST ALSO COORDINATE REMOVAL OF IMPROVEMENTS WITH UTILITY AGENCIES.
9. ANY EXISTING UTILITIES AND/OR IMPROVEMENTS THAT ARE NOT SPECIFIED FOR REMOVAL BUT BECOME DAMAGED DURING CONSTRUCTION SHALL BE COMPLETELY RESTORED OR REPLACED TO THE SATISFACTION OF THE CITY AND/OR COUNTY OF FRESNO, AT THE CONTRACTOR'S SOLE EXPENSE.
10. ALL DEMOLITION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PER THE CITY OF FRESNO STANDARDS AND SPECIFICATIONS. AND THE CITY STREET WORK PERMIT.
11. COORDINATE WITH UTILITY COMPANY FOR EXISTING UTILITY RELOCATION OR REMOVAL. ANY UTILITIES REMOVED SHALL BE REMOVED TO THE RIGHT-OF-WAY AND CAPPED PER UTILITY COMPANY STANDARDS.
12. AT THE LIMITS OF ALL CONCRETE AND ASPHALT CONCRETE DEMOLITION REMOVAL, THE IMPROVEMENTS SHALL EITHER BE SAWCUT OR REMOVED TO THE NEAREST CONTROL OR EXPANSION JOINT.
13. REMOVE TREES TO BOTTOM OF ROOT BALL.
14. PAVEMENT TO BE REMOVED UP TO EXISTING SAWCUT LINE AT THIS LOCATION.

UTILITY NOTE:

UTILITY INFORMATION SHOWN HEREON IS BASED ON RECORD INFORMATION SUPPLIED TO THE ENGINEER BY THE CITY, AND COUNTY. THE ENGINEER CAN MAKE NO GUARANTEE AS TO THE ACCURACY OR COMPLETENESS OF THE UTILITY FACILITIES SHOWN. PRIOR TO ANY SITE EXCAVATIONS, THE CONTRACTOR SHALL CONTACT CITY AND COUNTY OF FRESNO OFFICIALS AND VARIOUS AGENCIES AND REQUEST THAT THEY IDENTIFY THE LOCATION OF ALL UNDERGROUND UTILITIES AT THE SITE.

SURVEY NOTE:

SURVEY DATA SHOWN ON THIS SHEET WAS PROVIDED BY THE COUNTY OF FRESNO. BLAIR, CHURCH & FLYNN CONSULTING ENGINEERS MAKES NO REPRESENTATIONS OR GUARANTEES AS TO THE COMPLETENESS OR ACCURACY OF THE INFORMATION SHOWN.

Know what's below. Call before you dig.

SCALE: 1"=20'

0 5 10 20 40
SCALE IN FEET

11/01/2016
Date Signed:

COUNTY SPR #8000

Blair, Church & Flynn
CONSULTING ENGINEERS
455 Clovis Avenue, Suite 200
Clovis, California 93612
Tel (559) 326-1400
Fax (559) 326-1500

REVISIONS	BY
BACKCHECK 10/14/16	
1 BID ADDENDUM 1 11/01/16	

DYSON SIEGRIST JANZEN
DSJ ARCHITECTS
architecture
planning
interiors

Arthur Dyson A.I.A. Architect C-16824
Robert C. Siegrist A.I.A. Architect C-9651
Douglas K. Janzen R.A. Architect C-14260

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LICENSED ARCHITECT ROBERT C. SIEGRIST C-9651 REN. 10-31-17 STATE OF CALIFORNIA

County of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno Crisis Residential Treatment Facility

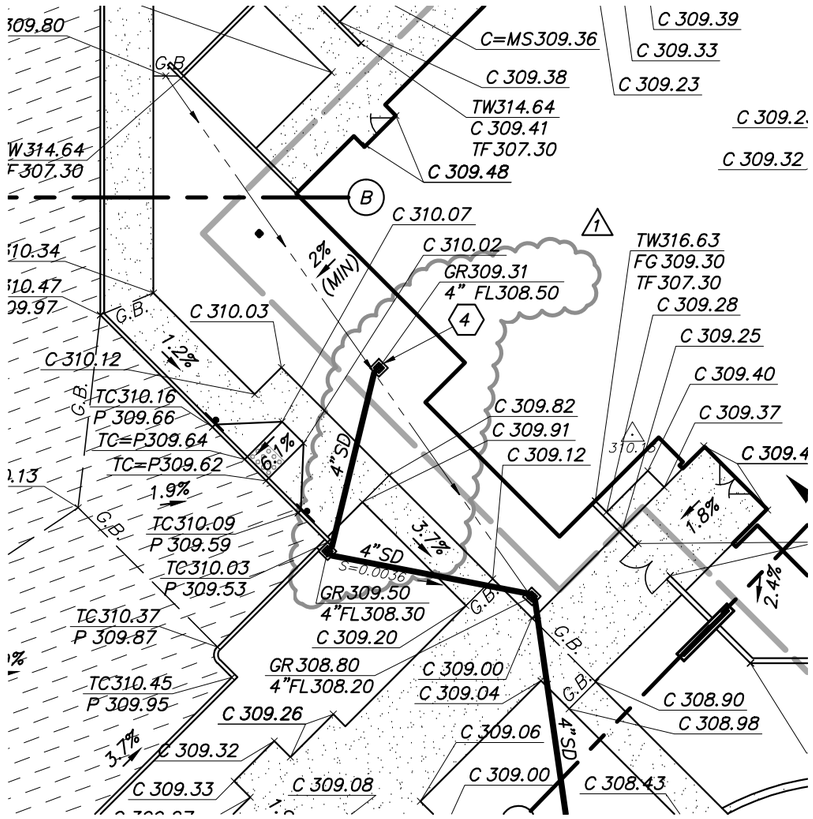
496 S. Barton Avenue, Fresno, CA 93702

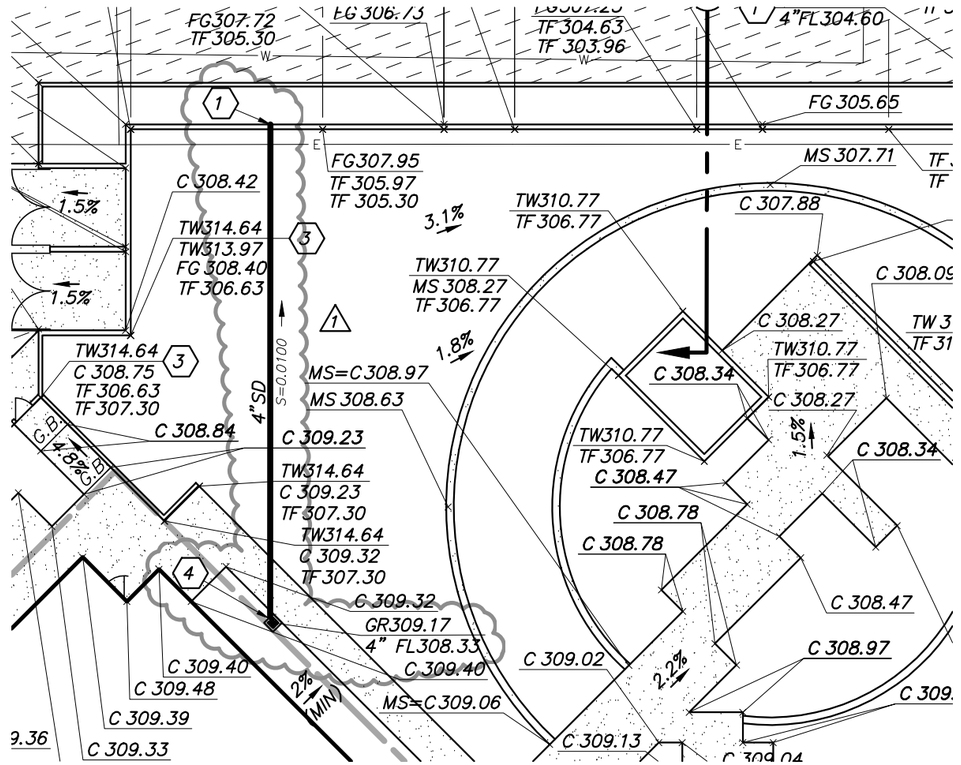
DEMOLITION PLAN

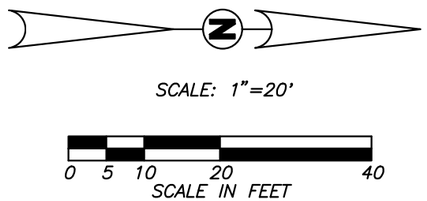
Date:	10/1/16
Scale:	AS INDICATED
Drawn:	WPC
Job:	11503
Sheet Number	C-101

REGISTERED PROFESSIONAL ENGINEER ERIC R. BAKER No. 47,135 CIVIL STATE OF CALIFORNIA

D:\temp\ A13-0295\Civil\Production\temp\plt\11503dm01.dwg, Layout1 - BCF, cb
Plot By: ecombs Plot On: 10/31/2016 - 8:42am







REGISTERED PROFESSIONAL ENGINEER
LANE R. BADER
No. 47033
CIVIL
STATE OF CALIFORNIA

11/01/2016
Date Signed:

REFERENCE SHEET: C-301

DYSON SIEGRIST JANZEN
DSJ ARCHITECTS

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County of Fresno
2281 Tulare Street
Fresno, CA 93721

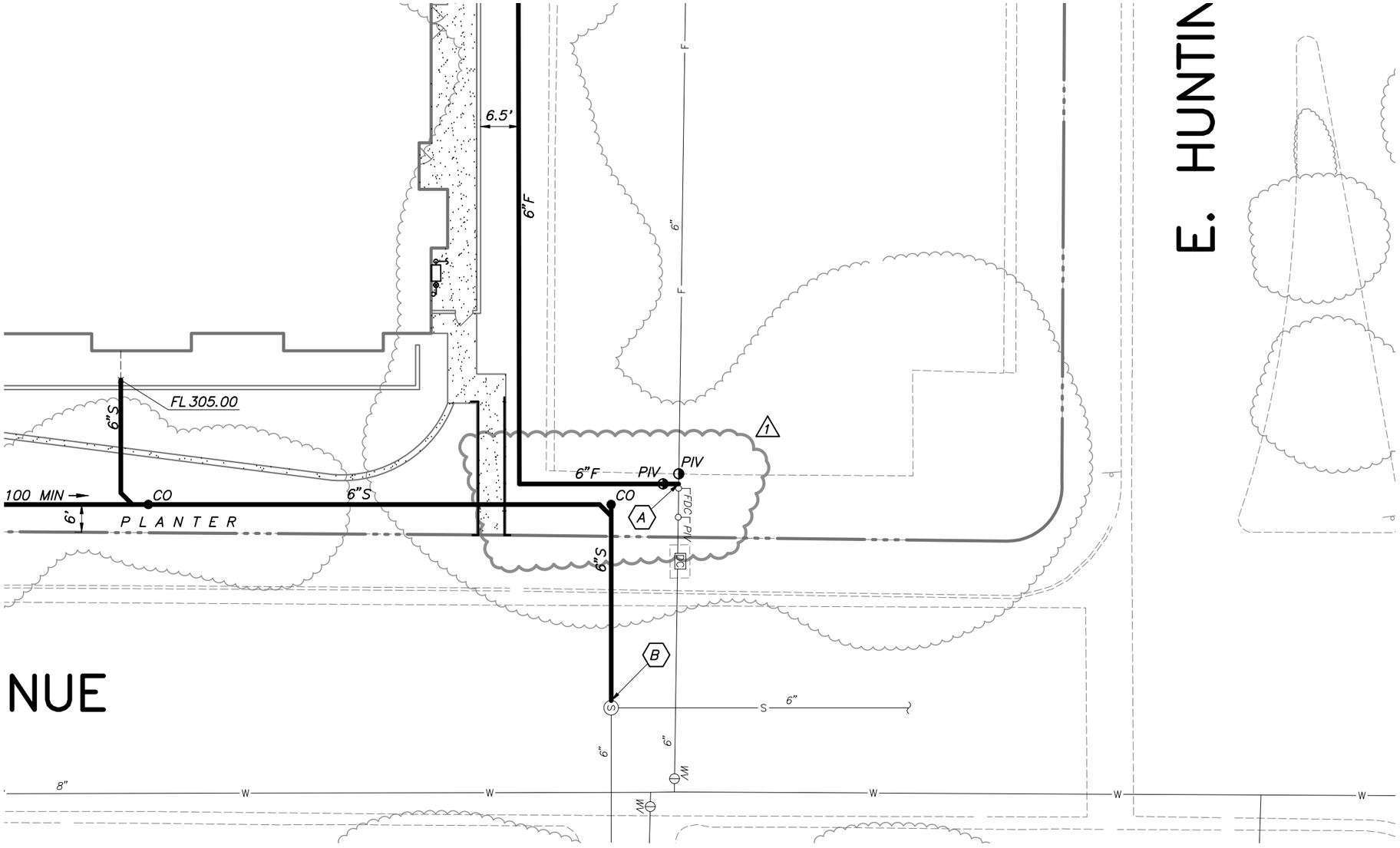
County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-C01

DATE:11/01/16



REGISTERED PROFESSIONAL ENGINEER
LANE R. BADER
No. 47033
CIVIL
STATE OF CALIFORNIA

11/01/2016
Date Signed:

REFERENCE SHEET: C-401

DYSON SIEGRIST JANZEN DSJ ARCHITECTS

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County of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno
Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

ADDENDUM DRAWING

AD-C02

DATE: 11/01/16

EAST INYO STREET

(EXIST'G FIRE LANE w/ CONT. RED PAINTED CURBS)

(E) CURB

P

RECY.

TRASH

GARDEN AREA

VAN

ORNAMENTAL FOUNTAIN

GROUPS R4, B, & A3 MIXED USE/
NON-SEPARATED OCCUPANCY.
TYPE VB CONSTRUCTION (SPRINKLERED).
ZONED CP.

S.B.

SCALE: 1"= 10'- 0"

SOUTH BARTON AVENUE

REGISTERED LANDSCAPE ARCHITECT PAUL H. SAITO NO. 1111 STATE OF CALIFORNIA

Saito Associates Landscape Architects
1295 N. Wishon Ave. – Fresno, California 93728
Tel: 559-227-5494 (o) – 559-246-6618 (c) - Fax: 559-222-5658
Email: psaito2@pacbell.net

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architecture
planning
interiors

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Architect C-16824
Robert C. Siegrist A.I.A.
Architect C-9651
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REGISTERED ARCHITECT ROBERT C. SIEGRIST C-9651 EXP. 10-31-17 STATE OF CALIFORNIA

County of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

PLANTING PLAN

Date:	9/2/16
Scale:	AS INDICATED
Drawn:	-
Job:	11503
Sheet Number	L-101

EAST INYO STREET

A6 A5 A4 A3

GARDEN AREA

CRISIS RESIDENTIAL
TREATMENT CENTER
11,655 S.F.

POC

PL PL

A7 A8 A9 A1 A2

SCALE: 1" = 10'- 0"

SOUTH BARTON AVENUE

REGISTERED LANDSCAPE ARCHITECT
PAUL M. SAITO
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REVISIONS	BY

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LICENSED ARCHITECT ROBERT C. SIEGRIST C-9651 REN. 10-31-17 STATE OF CALIFORNIA

County of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno
Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

IRRIGATION PLAN

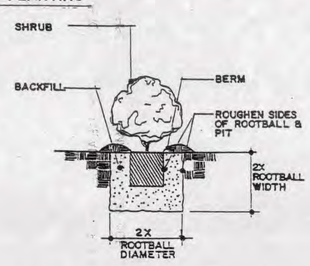
Date:	9/2/16
Scale:	AS INDICATED
Drawn:	-
Job:	11503
Sheet Number	L-102

PLANT LIST

QUANT	SIZE	DESCRIPTION	SYMBOL
		TREES	
22		**Existing Trees to Remain**	
4	15 Gal.	**Acer palmatum Tamukayama (Red Cut leaf Japanese Maple)**	
11	15 Gal.	**Acer palmatum "Bloodgood" (Red Japanese Maple)**	
3	15 Gal.	**Arbutus unecdo (Strawberry Tree)**	
3	24" Box	**Arecastrum romanzoffianum (Queen Palm)**	
21	15 Gal.	**Lagerstroemia indica "Lavender" Multi-stem (Crape Myrtle)**	
3	15 Gal.	**Liriodendron tulipifera (Tulip Tree)**	
6	15 Gal.	**Pistachia chinensis "Keith Davy" (Chinese Pistachio)**	
8	15 Gal.	**Prunus yedoensis (Yoshino Cherry)**	
6	15 Gal.	**Sequoia sempervirens "Aptos Blue" (Coastal Redwood)**	
7	15 Gal.	**Dwarf Citrus Trees – Navel Orange – Eureka Lemon – Kara Mandarin – Grapefruit – Kumquat - Lime**	
5	15 Gal.	**Dwarf Fruit Trees – Peach – Plum – Apricot – Fig Persimmon – Persimmon**	
		SHRUBS	
7	5 Gal.	**Aloe vera (Medicinal Aloe)**	
132	1 Gal.	**Azalea Southern indica (Sun Azalea)**	
32	5 Gal.	**Camellia japonica (Camellia)**	
184	1 Gal.	**Ceanothus griseus horizontalis (Carmel Creeper)**	
15	5 Gal.	**Elaeocarpus decipiens (Japanese Blueberry)**	
17	1 Gal.	**Hydrangea macrophylla (Hydrangea)**	
45	5 Gal	**Mahonia acquifolium compacta (Compact Oregon Grape)**	
58	5 Gal.	**Nandina domestica compacta – (Compact Heavenly Bamboo)**	
42	1 Gal.	**Phormium tenax atropurpurea (Bronze Flax)**	
12	15 Gal.	**Podocarpus macrophylla (Yew Pine**	
3	15 Gal.	**Strelitzia nicolai (Giant Bird of Paradise)**	
197	1 Gal.	**Tulbaghia violacea (Society Garlic)**	
23	5 Gal.	**Xylosma senticoa (Shiny Xylosma)**	
		VINES	
3	15 Gal.	**Camellia sasanqua (Trailing Camellia) Espaliered on wall**	
		GROUND COVERS	
	Rt. Cut.	**Ajuga repents (Bronze Ajuga) Plant 12" O.C.**	
	Rt. Cut.	**Gazania hybrid "Mitsui Yellow" (Yellow Gazania) Plant 12" O.C.**	
	Rt. Cut.	**Hypericum calycinum (St. Johns Wort) Plant 24" O.C.**	
	Rt. Cut.	**Polygonum capitatum (Pink Head Knotweed) Plant 12" O.C.**	
	Cu. Ft.	**2" to 6" River Cobble Rock**	
		LAWN	
	Sod	**Medium Fescue Mix**	



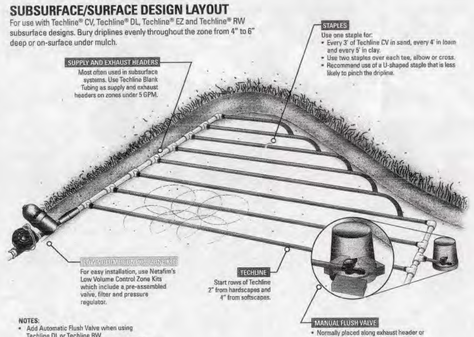
TREE PLANTING



SHRUB PLANTING

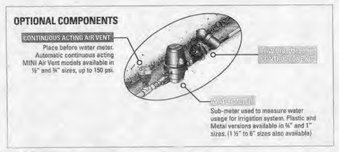
SUBSURFACE/SURFACE DESIGN LAYOUT

For use with Techline® CV, Techline® DL, Techline® EZ and Techline® RW subsurface designs. Bury driplines evenly throughout the zone from 4" to 6" deep or on-surface under mulch.

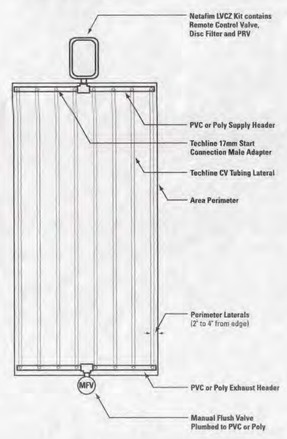


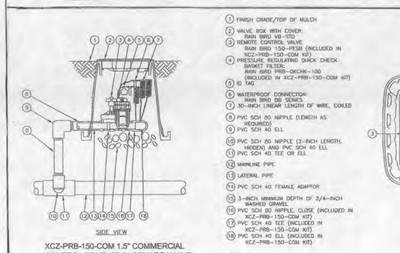
NOTES:
- Add Automatic Flush Valve when using Techline DL or Techline RW.
- Add Air Relief Valve at the highest point in the system when using Techline DL or Techline RW.

OPTIONAL COMPONENTS



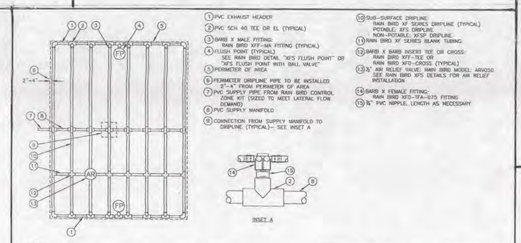
Techline CV End Feed Layout





1. FINISH GRADE/TOP OF MULCH
2. VALVE WITH SWING-TOP: RAIN BIRD VB-STD
3. REMOTE CONTROL VALVE: RAIN BIRD 150-PESB (INCLUDED IN XCZ-PRB-150-COM KIT)
4. PRESSURE REGULATING QUICK CHECK VALVE: RAIN BIRD PRB-QKCHK-100 (INCLUDED IN XCZ-PRB-150-COM KIT)
5. ID TAG
6. WATERPROOF CONNECTION: RAIN BIRD DB SERIES.
7. 30-INCH LINEAR LENGTH OF WIRE, COILED
8. PVC SCH 80 NIPPLE (LENGTH AS REQUIRED)
9. PVC SCH 40 ELL
10. PVC SCH 80 NIPPLE (2-INCH LENGTH, HIDDEN) AND PVC SCH 40 ELL
11. PVC SCH 40 TEE OR ELL
12. MAINLINE PIPE
13. LATERAL PIPE
14. PVC SCH 40 FEMALE ADAPTOR
15. 3-INCH MINIMUM DEPTH OF 3/4"-INCH WASHED GRAVEL
16. PVC SCH 80 NIPPLE, CLOSE (INCLUDED IN XCZ-PRB-150-COM KIT)
17. PVC SCH 40 TEE (INCLUDED IN XCZ-PRB-150-COM KIT)
18. PVC SCH 40 ELL (INCLUDED IN XCZ-PRB-150-COM KIT)

XCZ-PRB-150-COM 1.5" COMMERCIAL CONTROL ZONE KIT IN SQUARE VALVE BOX, U CONFIGURATION
OPTION 2

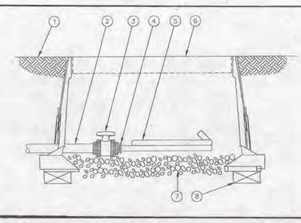


1. PVC EXHAUST HEADER
2. PVC SCH 40 TEE OR EL (TYPICAL)
3. BARB X MALE FITTING: RAIN BIRD XFF-MA FITTING (TYPICAL)
4. FLUSH POINT (TYPICAL) SEE RAIN BIRD DETAIL "XFS FLUSH POINT WITH BALL VALVE"
5. PERIMETER OF AREA
6. PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
7. PVC SUPPLY PIPE FROM RAIN BIRD CONTROL ZONE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
8. PVC SUPPLY MANIFOLD
9. CONNECTION FROM SUPPLY MANIFOLD TO DRIPLINE (TYPICAL)– SEE INSET A
10. SUB-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFS DRIPLINE NON-POTABLE: XFSP DRIPLINE
11. RAIN BIRD XFF-MA FITTING
12. BARB X BARB INSERT TEE OR CROSS: RAIN BIRD XFT-TEE OR RAIN BIRD XFT-CROSS (TYPICAL)
13. ½" AIR RELIEF VALVE: RAIN BIRD MODEL ARVXSS SEE RAIN BIRD XFS DETAILS FOR AIR RELIEF INSTALLATION
14. BARB X FEMALE FITTING: RAIN BIRD XFS-TFA-075 FITTING
15. ¾" PVC NIPPLE, LENGTH AS NECESSARY.

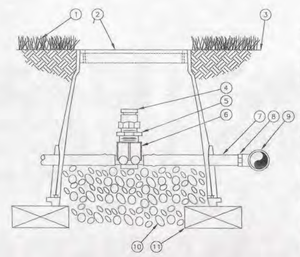
XFS SUB-SURFACE DRIPLINE
N.T.S. CENTER FEED LAYOUT 12-18-2012

XFS Dripline Maximum Lateral Lengths (Feet)

Inlet Pressure psi	12" Spacing Nominal Flow (gph)	12" Spacing Nominal Flow (gpm)	18" Spacing Nominal Flow (gph)	18" Spacing Nominal Flow (gpm)	24" Spacing Nominal Flow (gph)	24" Spacing Nominal Flow (gpm)
	0.6	0.9	0.6	0.9	0.6	0.9
15	275	150	334	230	434	322
20	340	188	383	294	509	389
30	390	230	415	360	585	454
40	395	255	465	402	602	474
50	417	285	508	430	630	490
60	460	290	550	450	780	514

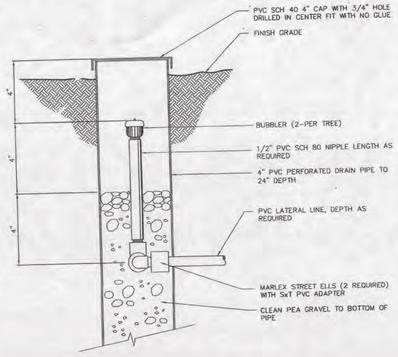


1. FINISH GRADE
2. PVC DRIP MANIFOLD PIPE
3. PVC 1" X ¾" TRUE UNION BALL VALVE
4. EASY FIT MALE X BARB ADAPTER: RAIN BIRD XFF-MA-075
5. SUB-SURFACE DRIPLINE: RAIN BIRD XF SERIES BLANK TUBING
6. 12-INCH VALVE BOX WITH COVER: RAIN BIRD VB-STD
7. 3-INCH MINIMUM DEPTH OF ¾" WASHED GRAVEL
8. BRICK (1 OF 2)



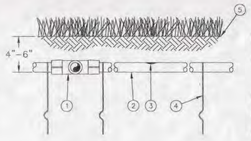
1. TURF GRASS
2. SUBTERRANEAN EMITTER BOX: RAIN BIRD SEB 7XB
3. FINISH GRADE
4. ½" AIR RELIEF VALVE: RAIN BIRD ARVXSS TO BE INSTALLED AT HIGH POINTS IN DRIP ZONE
5. ½" X ¾" PVC REDUCER BUSHING
6. BARB X FEMALE THREAD CONNECTOR: RAIN BIRD XFD-TFA FITTING
7. ½" BLANK DRIPLINE TUBING: RAIN BIRD XF SERIES
8. BARB X MALE THREAD CONNECTOR: RAIN BIRD XFF-MA FITTING
9. PVC TEE CONNECTED TO PVC HEADER PIPE
10. 3" MINIMUM DEPTH OF ¾" WASHED GRAVEL
11. BRICK (1 OF 2)

XFS SUB-SURFACE DRIPLINE
N.T.S. 1/2" AIR RELIEF VALVE IN XFS DRIPLINE 12-18-2012



TREE BUBBLER
Not to Scale

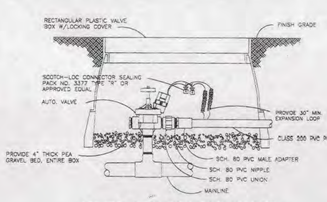
XFS SUB-SURFACE DRIPLINE
N.T.S. FLUSH POINT WITH BALL VALVE 12-18-2012



1. EASY FIT COMPRESSION TEE: RAIN BIRD MDCTEE
2. SUB-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFS DRIPLINE NON-POTABLE: XFSP DRIPLINE
3. INLINE DRIP EMITTER
4. TIE DOWN STAKE: RAIN BIRD TDS-050 WITH BEND (TYPICAL)
5. TURF/FINISH GRADE OR SHRUB BED WITH MULCH

NOTES:
1. PLACE TIE DOWN STAKES EVERY THREE FEET IN SAND, FOUR FEET IN LOAM, AND FIVE FEET IN CLAY.
2. AT FITTINGS WHERE THERE IS A CHANGE OF DIRECTION SUCH AS TEES OR ELBOWS, USE TIE-DOWN STAKES ON EACH LEG OF THE CHANGE OF DIRECTION.
3. INSERTION PLOW AND TRENCHED INSTALLATIONS DO NOT REQUIRE TIE DOWN STAKES.

XFS SUB-SURFACE DRIPLINE BURIAL
N.T.S. 12-18-2012



AUTOMATIC CONTROL VALVE

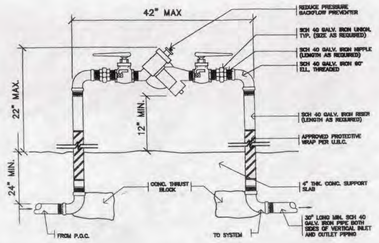
LEGEND

SYM	DESCRIPTION	TYPE	MANUFACTURER
•	RWS-B-C-1401	ROOT WATERING SYSTEM WITH 1401 BUBBLER – 2/TREE	RAINBIRD
	XCZ-150-PRB-COM	HIGH VOLUME CONTROL ZONE KIT	RAINBIRD
	PGA - 1 ½"	ELECTRIC CONTROL VALVE	RAINBIRD
⊕	XFS	FLUSH POINT WITH BALL VALVE	RAINBIRD
	ESP-LXME	12 STATION CONTROLLER	RAINBIRD
	XFS	½" AIR RELIEF VALVE IN MAIN PVC HEADERS	RAINBIRD
	XQF 1018100	1" DRIPLINE HEADER -18" SPACING	RAINBIRD
	XFS	SUB-SURFACE DRIPLINE WITH COPPER SHIELD	RAINBIRD
	825Y – 1 ½"	VAUME BREAKER	FEBCO
	2"	MAINLINE - SCHEDULE 40	
	¾" – 1 ½"	LATERAL LINE - CLASS 200 PVC	
	4"	PVC SLEEVES	
	PFX 750	SELF CLOSING FAUCET	PROFLOW

IRRIGATION NOTES

1. **P.O.C. - Tie new irrigation mainlines to vacuum breaker.**
2. **All mainline shall have a minimum cover of 18". All laterals shall have a minmum cover of 12".**
3. **All wires installed under concrete walks shall be in Schedule 40 PVC conduit, size as required.**
4. **All PVC Pipes under concrete walks and asphalt roads shall be in Xchedule 40 PVC conduit, 2 times the size of the pipe.**
5. **Contractor shall coordinate with othe trades to install sleeves as required.**
6. **Drawings are diagrammatic. Install mainline and equipment in planted aareas where possible.**
7. **Contractor shall install anti-sipon valve above ground at least 6" above highest sprinkler head.**
8. **1 GPM to 17 GPM 1" Control Zones.**
9. **18 to 30 GPM 1 ½" Control Zones.**

AUTOMATIC CONTROLLER



BACKFLOW PREVENTION ASSEMBLY

REGISTERED LANDSCAPE ARCHITECT PAUL A. SAITO NO. 1111 STATE OF CALIFORNIA

Saito Associates Landscape Architects
1295 N. Wishon Ave. – Fresno, California 93728
Tel: 559-227-5494 (o) – 559-246-6618 (c) - Fax: 559-222-5658
Email: psaito2@pacbell.net

REVISIONS	BY

DYSON SIEGRIST JANZEN
DSJ ARCHITECTS
architecture planning interiors
Arthur Dyson A.I.A. Architect C-16824
Robert C. Siegrist A.I.A. Architect C-9651
Douglas K. Janzen R.A. Architect C-14260
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1295 N. Wishon Ave.
Fresno, CA 93728
Phone 559.497.6370
Fax 559.486.4909
Web: dsjarchitects.com
LICENSED ARCHITECT ROBERT C. SIEGRIST C-9651 REN. 10-31-13 STATE OF CALIFORNIA

County of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

LANDSCAPE CONSTRUCTION DETAILS

Date:	9/2/16
Scale:	AS INDICATED
Drawn:	-
Job:	11503
Sheet Number	L-103

End of Addendum 1

ADDENDUM NO. 2 CONTRACT NO. 16-S-05

PROJECT

Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

Dated: 11-10-2016



Nov. 10, 2016
Date Signed

Capital Projects Division Manager: _____
Stuart G. Seiden, #C18719
Lic. Expiration: 03/31/17

Fresno County Department of Public Works and Planning
2220 Tulare Street, 8TH Floor
Fresno, CA 93721-2104



11-10-2016
Date Signed

Architect of Record: _____
Robert C. Siegrist, #C9651,
Lic. Expiration: 10/31/17

Dyson Siegrist Janzen Architects, Inc.
1295 N. Wishon Avenue, Suite #101
Fresno, CA 93728

The foregoing documents are amended in the respects as herein set forth. This addendum and the amendments herein shall become part of said documents and of any contract entered into pursuant to said documents.

PLEASE ACKNOWLEDGE THIS ADDENDUM ON PAGE 00 42 13- 2 OF THE PROJECT MANUAL. IF YOU HAVE GIVEN THE CONTRACT DOCUMENTS TO SOMEONE ELSE, PLEASE FORWARD THIS ADDENDUM.

A. BID FORMS AND CONTRACT CONDITIONS:

No Changes

B. SPECIFICATIONS:

1. Section 00 00 03 Table of Contents

   a. Delete Division 12 - Furnishing

2. Section 01 50 00 Temporary Facilities and Controls

   a. Under Part 3.02 Item B Water Service, delete paragraph, “Existing well to be demolished at the North East portion …

   b. Under Part 3.02 Item D Electric Power Service, delete first sentence, “Contractor may tap into site electrical service at the existing Building 2…”

   c. Contractor is responsible for tapping into temporary power and water from existing adjacent County facility as authorized by the Owner. Temporary lines shall be removed and put back to original condition once construction is completed. Temporary power and water will be provided by the Owner.

3. Section 03 30 00 Cast-In-Place Concrete

   a. W.R. Meadows, Inc., Perminator HP 15 mil Underslab Vapor Barrier is an acceptable substitution for Part 2.02 Item D1a 15 mil Stegowrap Vapor Barrier, Stego, Industries LLC.

4. Section 04 22 00 Concrete Unit Masonry

   a. Part 2.02 Item B3. Weight shall be either light weight or normal weight at contractor’s option. Remove all references to medium weight blocks in Civil drawings.

5. Section 07 13 13 Self-Adhering Sheet Waterproofing

   a. Part 2.01 Item A1. W.R. Meadows, Inc., Air Shield Self Adhering Air/Vapor and Liquid Moisture Barrier is an acceptable substitution for Part 2.01 Item A1. Grace Perm-A-Barrier Wall Flashing.

C. DRAWINGS:

1. Sheet A-002 Door Schedules

    a. In Door Schedule table, at Gate G1, replace reference to Sheet 5/503 with Sheet A-103.

    b. In Door Schedule table, at Gate G2, G3 & G4, replace reference to Sheet 6/503 with Sheet A-103.

2. Sheet A-101 Site Plans

    a. At Keynote 17, replace reference to Elevation 6/A-503 with Gate B/A-103.

    b. At Keynote 18, replace reference to Elevation 5/A-503 with Gate A/A-103.

3. Sheet A-103 Gate Details

    a. Rename Gate G1 to Gate A.

    b. Rename Gate G2 to Gate B.

4. Sheet A-602 Interior Elevations

    a. Revise Keynote 13 to read “4’-8” diameter circular aluminum framed exterior window”.

5. Sheet A-603 Interior Elevations

    a. At Keynote 4, remove word “hollow metal” to read “4’ diameter circular fire rated window”.

6. Sheet A-804 Details

    a. At Keynote 35, replace type “DVG” with ”DTR” to read “Stockton (DTR) aluminum channel drywall reveal, 3” wide w/ 5/8” ground”.

    b. In Detail 11, replace letters DVG with DTR at Keynote 35.

7. Sheet E-103 Electrical Schedules

    a. Revised the luminaire schedule types S1, S2. All fixtures shall be 120V. See revised E-103.

8. Sheet E-201 Electrical Site Plan

    a. Added (1) exterior outlet and (4) lights at the Pavilion. See revised E-201.

9. Sheet E-302 Power Plan

    a. Added (1) exterior outlet for irrigation controller. See revised E-302.

10. Sheet C-501 Details

    a. In Detail N, omit the 4” of class 2 aggregate base under the concrete masonry wall footing.

D. GENERAL CLARIFICATIONS

See attached Mechanical Addendum items and revised drawings.

MDC

MECHANICAL DESIGN CONCEPTS, INC.

1060 W. Sierra, Suite 101
Fresno, CA 93711
Phone: (559) 437-0376
Fax: (559) 437-0297

Stephen A. Becker, P.E.
Michael D. Cantelmi, P.E.

November 10, 2016

15037

Mayuko Russell
DSJ Architects
1295 N. Wishon Avenue
Fresno, CA 93728

Project: Crisis Residential Treatment Facility

Dear Ms. Russell:

Please issue the following items in your next published addendum for this project:

PLUMBING DRAWINGS

1. Refer to Sheet P-300: Add Emergency Drain ED-1 to the Plumbing Fixture Schedule. Jay R. Smith 2005Y02.

MECHANICAL DRAWINGS

1. Refer to Sheet M-101: Remove the note regarding a fire/smoke damper at Lounge 26.

2. Refer to Sheet M-101: At Detail A – delete the "H" hexagon. The louver will be called for as an accessory to the doors – refer to Door Schedule.

3. Refer to Sheet M-301: At Detail E, change the 12" vertical dimension to 12" minimum. At Detail J, the KBTZ anchors shall be tested per the note in Detail F. At Detail K, the anchors shall be Hilti KBTZ – and shall be tested per the note in Detail F.

SPECIFICATIONS

1. Refer to Sections 230800 and 250900. Both Energy Recovery Ventilators shall include the following accessories: 1) Two filter pressure drop sensors – one for the outside air and one for the exhaust air. These sensors shall send status and alarm signals to the energy management system (EMS). 2) Two fan status points which shall be reported to the EMS.

Sincerely,



Stephen A. Becker, P.E.

PANEL "L" SCHEDULE

120/208V 3Φ 4W — INDOOR / SURFACE

CKT. NO.	DESCRIPTION	BREAKER AMPS	BREAKER POLE(S)	VA	Φ	VA	BREAKER AMPS	BREAKER POLE(S)	DESCRIPTION	CKT. NO.
1	LCP CONTROL POWER	15	1	150	A	448	20	1	LIGHTS - TV ROOM, QUIET ROOM	2
3	LIGHTS - DINING, SITTING	20	1	1013	B	848	20	1	LIGHTS - BEDROOM CORRIDOR	4
5	LIGHTS - LOUNGE, ENTRY, OFFICE HALLWAY	20	1	794	C	258	15	1	LIGHTS - SOUTHEAST BEDROOMS	6
7	LIGHTS - OFFICES AREA	20	1	1025	A	258	15	1	LIGHTS - EAST BEDROOMS	8
9	LIGHTS - EXTERIOR DOWNLIGHTS	20	1	368	B	258	15	1	LIGHTS - NORTHEAST BEDROOMS	10
11	LIGHTS - EXTERIOR BOLLARDS, GAZEBO	20	1	296	C	258	15	1	LIGHTS - WEST BEDROOMS	12
13	SPARE	20	1		A	220	20	1	LIGHTS - ELEC, MECH, STOR, LAUNDRY	14
15	SPARE	20	1		B		20	1	SPARE	16
17	EXIT SIGNS AND EMERGENCY LIGHTS	20	1	22	C		20	1	SPARE	18

LOAD SUMMARY: Φ A 2101 VA; Φ B 2487 VA; Φ C 1628 VA
CONNECTED LOAD: 6.2 kVA
MAX CURRENT: 21 A

BUSING: 100A
MAIN: MLO
TYPE: A-SERIES PANELBOARD

PANEL "M" SCHEDULE

120/208V 3Φ 4W — INDOOR / SURFACE

CKT. NO.	DESCRIPTION	BREAKER AMPS	BREAKER POLE(S)	VA	Φ	VA	BREAKER AMPS	BREAKER POLE(S)	DESCRIPTION	CKT. NO.
1	HC-1	50	3	4550	A	700	15	2	IDUs/MCUs - NORTH & WEST BDR, SUPP. AREAS	2
3	-----	--	--	4550	B	700	--	--	-----	4
5	-----	--	--	4550	C	415	15	2	IDUs/MCUs - SOUTH BDR, SUPP. AREAS	6
7	HC-2	50	3	4550	A	415	--	--	-----	8
9	-----	--	--	4550	B	380	15	2	IDUs/MCUs - SOUTH OFFICES & SUPPORT AREAS	10
11	-----	--	--	4550	C	380	--	--	-----	12
13	ODU-1 (8 TON)	50	3	4056	A	1040	15	2	ODU/IDU-65	14
15	-----	--	--	4056	B	1040	--	--	-----	16
17	-----	--	--	4056	C	300	15	1	WATER HEATER AND CIRCULATION PUMP	18
19	ODU-1 (6 TON)	35	3	2196	A				SPACE ONLY	20
21	-----	--	--	2196	B				SPACE ONLY	22
23	-----	--	--	2196	C				SPACE ONLY	24
25	ODU-2 (6 TON)	35	3	2196	A				SPACE ONLY	26
27	-----	--	--	2196	B				SPACE ONLY	28
29	-----	--	--	2196	C				SPACE ONLY	30
31	ERV-1	20	3	1872	A				SPACE ONLY	32
33	-----	--	--	1872	B				SPACE ONLY	34
35	-----	--	--	1872	C				SPACE ONLY	36
37	ERV-2	30	3	2640	A				SPACE ONLY	38
39	-----	--	--	2640	B				SPACE ONLY	40
41	-----	--	--	2640	C				SPACE ONLY	42

LOAD SUMMARY: Φ A 24215 VA; Φ B 24180 VA; Φ C 23155 VA
CONNECTED LOAD: 71.6 kVA
MAX CURRENT: 202 A

BUSING: 400A
MAIN: MLO
TYPE: A-SERIES PANELBOARD

PANEL "P1" SCHEDULE

120/208V 3Φ 4W — INDOOR / FLUSH

CKT. NO.	DESCRIPTION	BREAKER AMPS	BREAKER POLE(S)	VA	Φ	VA	BREAKER AMPS	BREAKER POLE(S)	DESCRIPTION	CKT. NO.
1	OUTLETS - ELEC, MECH, STOR, LAUNDRY	20	1	720	A	900	20	1	OUTLETS - BEDROOM 61	2
3	OUTLETS - VANITY 56	20	1	180	B	900	20	1	OUTLETS - BEDROOM 60	4
5	OUTLETS - VANITY 54, LOUNGE 43	20	1	360	C	900	20	1	OUTLETS - BEDROOM 59	6
7	OUTLETS - CORRIDOR 25, VANITY 47	20	1	360	A	900	20	1	OUTLETS - BEDROOM 58	8
9	OUTLETS - VANITY 45, LOUNGE 44	20	1	360	B	900	20	1	OUTLETS - BEDROOM 52	10
11	OUTLETS - CORRIDOR 25, VANITY 38	20	1	360	C	900	20	1	OUTLETS - BEDROOM 51	12
13	OUTLETS - VANITY 36, LOUNGE 35	20	1	360	A	900	20	1	OUTLETS - BEDROOM 50	14
15	OUTLETS - CORRIDOR 25, VANITY 29	20	1	360	B	900	20	1	OUTLETS - BEDROOM 49	16
17	OUTLETS - VANITY 27, LOUNGE 26	20	1	360	C	900	20	1	OUTLETS - BEDROOM 43	18
19	OUTLETS - CORRIDORS 24, 25	20	1	540	A	900	20	1	OUTLETS - BEDROOM 42	20
21	OUTLET - LAUNDRY 63 WASHER	20	1	1000	B	900	20	1	OUTLETS - BEDROOM 41	22
23	OUTLET - LAUNDRY 63 WASHER	20	1	1000	C	900	20	1	OUTLETS - BEDROOM 40	24
25	OUTLET - LAUNDRY 63 DRYER	30	2	2500	A	900	20	1	OUTLETS - BEDROOM 34	26
27	-----	--	--	2500	B	900	20	1	OUTLETS - BEDROOM 33	28
29	OUTLET - LAUNDRY 63 DRYER	30	2	2500	C	900	20	1	OUTLETS - BEDROOM 32	30
31	-----	--	--	2500	A	900	20	1	OUTLETS - BEDROOM 31	32
33	OUTLET - LAUNDRY 21 DRYER	30	2	2500	B		20	1	SPARE	34
35	-----	--	--	2500	C		20	1	SPARE	36
37	OUTLET - LAUNDRY 21 WASHER	20	1	1000	A		20	1	SPARE	38
39	SPARE	20	1		B		20	1	SPARE	40
41	SPARE	20	1		C		20	1	SPARE	42

LOAD SUMMARY: Φ A 13380 VA; Φ B 11400 VA; Φ C 11580 VA
CONNECTED LOAD: 36.4 kVA
MAX CURRENT: 112 A

BUSING: 200A
MAIN: MLO
TYPE: POWERMARK PLUS 3-PHASE LOAD CENTER

PANEL "P2" SCHEDULE

120/208V 3Φ 4W — INDOOR / FLUSH

CKT. NO.	DESCRIPTION	BREAKER AMPS	BREAKER POLE(S)	VA	Φ	VA	BREAKER AMPS	BREAKER POLE(S)	DESCRIPTION	CKT. NO.
1	OUTLETS - RECEPTION	20	1	720	A	1000	20	1	OUTLETS - BREAK ROOM REFRIGERATOR	2
3	OUTLETS - ADMIN OFFICE	20	1	540	B	1000	20	1	OUTLETS - BREAK ROOM COUNTER	4
5	OUTLETS - ADMIN OFFICE	20	1	360	C	720	20	1	OUTLETS - BREAK ROOM	6
7	OUTLETS - CONFERENCE RM	20	1	720	A	500	20	1	OUTLET - HALL 16 DRINKING FOUNTAIN	8
9	OUTLETS - CONFERENCE RM	20	1	720	B	900	20	1	OUTLETS - ENTRY, LOUNGE, SITTING, DINING	10
11	OUTLETS - OFFICE 11	20	1	720	C	900	20	1	OUTLETS - ENTRY, LOUNGE, SITTING, DINING	12
13	OUTLETS - OFFICE 13	20	1	720	A	720	20	1	OUTLETS - ENTRY, LOUNGE, SITTING, DINING	14
15	OUTLETS - OFFICE 15	20	1	720	B		20	1	SPARE	16
17	OUTLETS - OFFICE 14	20	1	720	C		20	1	SPARE	18
19	OUTLETS - UNISEX, HALL 16	20	1	540	A		20	1	SPARE	20
21	OUTLETS - MEDS	20	1	900	B		20	1	SPARE	22
23	SPARE	20	1		C		20	1	SPARE	24
25	SPACE ONLY	20	1		A		20	1	SPACE ONLY	26
27	SPACE ONLY	20	1		B		20	1	SPACE ONLY	28
29	SPACE ONLY	20	1		C		20	1	SPACE ONLY	30
31	SPACE ONLY	20	1		A		20	1	SPACE ONLY	32
33	SPACE ONLY	20	1		B		20	1	SPACE ONLY	34
35	SPACE ONLY	20	1		C		20	1	SPACE ONLY	36
37	SPACE ONLY	20	1		A		20	1	SPACE ONLY	38
39	SPACE ONLY	20	1		B		20	1	SPACE ONLY	40
41	SPACE ONLY	20	1		C		20	1	SPACE ONLY	42

LOAD SUMMARY: Φ A 4920 VA; Φ B 4780 VA; Φ C 3420 VA
CONNECTED LOAD: 13.1 kVA
MAX CURRENT: 41 A

BUSING: 200A
MAIN: MLO
TYPE: POWERMARK PLUS 3-PHASE LOAD CENTER

PANEL "K" SCHEDULE

120/208V 3Φ 4W — INDOOR / FLUSH

CKT. NO.	DESCRIPTION	BREAKER AMPS	BREAKER POLE(S)	VA	Φ	VA	BREAKER AMPS	BREAKER POLE(S)	DESCRIPTION	CKT. NO.
1	OUTLETS - ISLAND	20	1	360	A	4500	50	2	RANGE	2
3	OUTLETS - ISLAND	20	1	360	B	4500	--	--		4
5	OUTLET - REFRIGERATOR	20	1	1000	C	4500	50	2	RANGE	6
7	OUTLETS - COUNTER	20	1	540	A	4500	--	--		8
9	OUTLETS - COUNTER	20	1	360	B	1000	20	1	OUTLET - DISPOSAL	10
11	OUTLET - REFRIGERATOR	20	1	1000	C	1000	20	1	OUTLET - DISHWASHER	12
13	OUTLETS - COUNTER	20	1	360	A	1000	20	1	OUTLET - DISPOSAL	14
15	OUTLETS - COUNTER	20	1	360	B	1000	20	1	OUTLET - DISHWASHER	16
17	SPARE	20	1		C	1000	20	1	OUTLET - HOOD/MICROWAVE	18
19	SPARE	20	1		A	1000	20	1	OUTLET - HOOD/MICROWAVE	20
21	SPARE	20	1		B				SPACE ONLY	22
23	SPARE	20	1		C				SPACE ONLY	24
25	SPACE ONLY				A				SPACE ONLY	26
27	SPACE ONLY				B				SPACE ONLY	28
29	SPACE ONLY				C				SPACE ONLY	30

LOAD SUMMARY: Φ A 12260 VA; Φ B 7580 VA; Φ C 8500 VA
CONNECTED LOAD: 28.3 kVA
MAX CURRENT: 102 A

BUSING: 200A
MAIN: MLO
TYPE: POWERMARK PLUS 3-PHASE LOAD CENTER

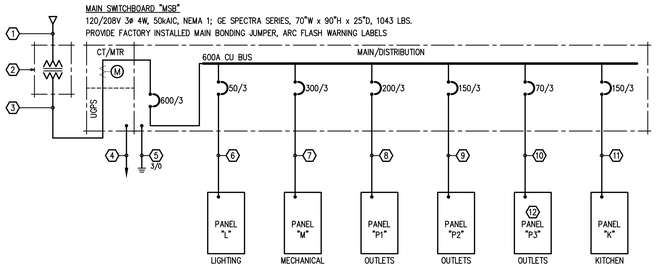
PANEL "P3" SCHEDULE

120/208V 3Φ 4W — INDOOR / SURFACE

CKT. NO.	DESCRIPTION	BREAKER AMPS	BREAKER POLE(S)	VA	Φ	VA	BREAKER AMPS	BREAKER POLE(S)	DESCRIPTION	CKT. NO.
1	ELECTRONICS BOARD OUTLETS	20	1	360	A	500	20	1	* FIRE ALARM CONTROL PANEL	2
3	ELECTRONICS BOARD OUTLETS	20	1	360	B	100	15	1	* FIRE/SMOKE DAMPERS	4
5	ELECTRONICS BOARD OUTLETS	20	1	360	C	2500	30	2	SERVER RACK	6
7	OUTLET - GAZEBO	20	1	180	A	2500	--	--	-----	8
9	SPARE	20	1		B				SPACE ONLY	10
11	SPARE	20	1		C				SPACE ONLY	12
13	SPACE ONLY				A				SPACE ONLY	14
15	SPACE ONLY				B				SPACE ONLY	16
17	SPACE ONLY				C				SPACE ONLY	18

LOAD SUMMARY: Φ A 3540 VA; Φ B 460 VA; Φ C 2860 VA
CONNECTED LOAD: 6.9 kVA
MAX CURRENT: 30 A

BUSING: 100A
MAIN: MLO
TYPE: POWERMARK PLUS 3-PHASE LOAD CENTER
* PROVIDE RED LOCK-ON DEVICE ON C.B.



KEYNOTES

1. 4"C. UTILITY PRIMARY
2. UTILITY TRANSFORMER
3. (2) 5"C. UTILITY SECONDARY
4. 1"C. TO TEL. MPOE.
5. COPPER GROUNDING ELECTRODE PER CEC 250. SEE GROUNDING DETAILS AND SPECIFICATIONS.
6. 1"C. 4#6, 1#10G.
7. 3"C. 4#300kCMIL, 1#4G.
8. 2"C. 4#3/0, 1#6G.
9. 2"C. 4#3/0, 1#2G.
10. 1 1/4"C. 4#4, 1#8G.
11. 2"C. 4#3/0, 1#2G.
12. PROVIDE INTEGRAL 50kA SURGE PROTECTIVE DEVICE.

POWER SINGLE LINE DIAGRAM

NO SCALE — 1

VOLTAGE DROP CALCULATIONS

No.	Feeder Origin	Feeder Destination	Potential at Origin (P_i) (Volts)	System	Design Current (Amps)	Raceway Type	Sets of Cond.	Conductor Trade Size	Conductor Cross-Sectional Area (CM)	Conductor Material	DC Conductor Material Constant (K)	Q	Distance (ft)	Voltage Drop (VD) (Volts)	Potential at Load (P_f) (Volts)	Percent Voltage Drop (%VD)
1	MSB	PNL L	208	3-Phase	50	Steel	1	6	26240	CU	12.9	0.9980	15	0.64	207.36	0.31
2	MSB	PNL M	208	3-Phase	300	Steel	1	300 kCMIL	300000	CU	12.9	1.0490	10	0.23	207.77	0.11
3	MSB	PNL P1	208	3-Phase	200	PVC	1	3/0	167800	CU	12.9	1.0052	35	0.94	207.06	0.45
4	MSB	PNL P2	208	3-Phase	160	PVC	1	3/0	167800	CU	12.9	1.0052	175	3.75	204.25	1.80
5	MSB	PNL P3	208	3-Phase	70	PVC	1	4	41740	CU	12.9	1.0065	20	0.75	207.25	0.36
6	MSB	PNL K	208	3-Phase	175	PVC	1	3/0	167800	CU	12.9	1.0052	170	3.98	204.02	1.91
7	PNL M	HC-1	208	3-Phase	38	PVC	1	6	26240	CU	12.9	0.9980	165	5.33	202.67	2.56
8	PNL M	HC-2	208	3-Phase	38	PVC	1	6	26240	CU	12.9	0.9980	175	5.65	202.35	2.72
9	PNL M	ERV-2	208	3-Phase	22	PVC	1	8	16510	CU	12.9	1.0026	140	4.18	203.82	2.01
10	PNL M	ODU-2	208	3-Phase	18	PVC	1	6	26240	CU	12.9	0.9980	140	2.14	205.86	1.03
11	PNL Px Branch Ckt	First device on Ckt.	120	1-Phase	16	Steel	1	12	6530	CU	12.9	1.0101	56	3.58	116.42	2.98
12	PNL Px Branch Ckt	First device on Ckt.	120	1-Phase	16	Steel	1	10	10380	CU	12.9	0.9677	93	3.58	116.42	2.98

Formulae

VD (single phase or DC) = 2 x K x Q x I x D / CM

VD (three phase) = √3 x K x Q x I x D / CM

%VD = VD / P_i x 100

Definitions

VD = Voltage Drop (Volts)
K = DC Conductor Material Constant (12.9 for Copper, 21.2 for Aluminum)
Q = AC Adjustment Factor for conductors sized #2/0 AWG and larger (R_{ac} / R_{dc})
I = Current (Amps)
D = Distance to Load (ft)
CM = Conductor Cross-Sectional Area (Circular Mils)
P = Potential (Volts)

LIGHTING CONTROL PANEL "LCP" SCHEDULE

Relay #	Type	Ckt. #	Voltage	Button No.	Description
1	1P / 0-10V	L-3	120	1	DINING, SITTING DOWNLIGHTS
2	1P / 0-10V	L-3	120	2	DINING, SITTING UPLIGHTS
3	1P / 0-10V	L-3	120	3	KITCHEN DOWNLIGHTS
4	1P / 0-10V	L-3	120	4	KITCHEN UPLIGHTS
5	1P / 0-10V	L-5	120	5	LOUNGE, ENTRY DOWNLIGHTS
6	1P / 0-10V	L-5	120	6	LOUNGE, ENTRY UPLIGHTS
7	1P / 0-10V	L-5	120	7	HALLWAY DOWNLIGHTS
8	1P / 0-10V	L-2	120	8	TV ROOM DOWNLIGHTS
9	1P / 0-10V	L-2	120	9	QUIET ROOM DOWNLIGHTS
10	1P / 0-10V	L-4	120	10	CORRIDOR DOWNLIGHTS
11	1P	L-4	120	11	CORRIDOR TRACK LIGHTS
12	1P	L-9	120	12/SCHEDULE	FRONT EXTERIOR DOWNLIGHTS
13	1P	L-9	120	13/SCHEDULE	REAR EXTERIOR DOWNLIGHTS
14	1P	L-11	120	14/SCHEDULE	FRONT EXTERIOR BOLLARDS
15	1P	L-11	120	15/SCHEDULE	REAR EXTERIOR BOLLARDS
16	1P				SPARE

NOTES:
1. PROVIDE FACTORY STARTUP.
2. PROVIDE LOW VOLTAGE WIRING FOR SWITCHES PER MFG'R RECOMMENDATIONS.
3. PROVIDE PROGRAMMING LCP PER OWNER'S DIRECTION.

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER		LAMP	WATTS	VOLT	MOUNTING	REMARKS
A	PORTFOLIO	LD6A 20 D010TE ERW6A 20 930 6LWO H HB26	LED	32	UNV	REC	
B	PORTFOLIO	LD6A 15 D010TE ERW6A 15 930 6LWO H HB26	LED	22	UNV	REC	
C	OXYGEN	FUSE VANITY 37-544-24	LED	12	120	WALL	
D	LIGHTWAY	CLP-11-LED-U-2-W2-WSA-DIM	LED	13	UNV	SURF	
F	METALUX	4WSNLED LD4 44SL F UNF L830 CD1 U	LED	44	UNV	SURF	
G	METALUX	4SNLED LD4 46SL LC UNV L830 CD1 U	LED	41	UNV	SURF	ON TOP OF SOFFIT FACING UP
H	SPECTRUM	FPE6LEDOS 10L 30K DS10 1 BH12 FB2012 AR62230S SG FG	LED	16	120	REC	
J	PORTFOLIO	LD6A 10 D010TE ERW6A 10 930 6LWO H HB26	LED	14	UNV	REC	
H1	HALO	SLD612 830 WH UNV JB	LED	15	120	SURF	SHOWER LIGHT
K6	HALO	L652P-LC901CB120/(3) L805 LRG WW 830 P	LED	120	120	SURF	FIELD CUT TRACK TO FIT
K14	HALO	(2)L652P-L908P-LC901CB120/(5) L805 LRG WW 830 P	LED	120	120	SURF	FIELD CUT TRACK TO FIT
P1	PORTFOLIO	FVRLD6A 15 D010TE FERM6A 15 830 FVR6LM1 L1 BL85 HB26	LED	23	UNV	REC	
S1	INVUE	ABB B2 LED 36 D1 S XX 8030	LED	32	UNV	BOLLARD	
S2	SPECTRUM	SPC0310LEDXT 10L35K MD E1 SQ WL RDC5 HM PMG" XX	LED	10	120	PENDANT	
X	BARRON	G400C 1 BA	LED	1	UNV	WALL	
XL	BARRON	TRL EM BR CL	LED	1	UNV	WALL	
XL1	SURELITE	LEM	LED	1	UNV	WALL	

Hardin-Davidson Engineering
356 Pollasky Ave., Suite 200
Clovis, CA 93612
559.323.4995 tel • 559.323.4928 fax

REVISIONS	BY
BACKCHECK 10/14/16	
⚠ ADDENDUM 2 11/2/16	

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DSJ ARCHITECTS
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planning
interiors

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Robert C. Siegrist A.I.A. Architect C-9651
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Dyson Siegrist Janzen Architects, Inc.
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LICENSED ARCHITECT ROBERT C. SIEGRIST C-9651 REN. 10-31-17 STATE OF CALIFORNIA

Country of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

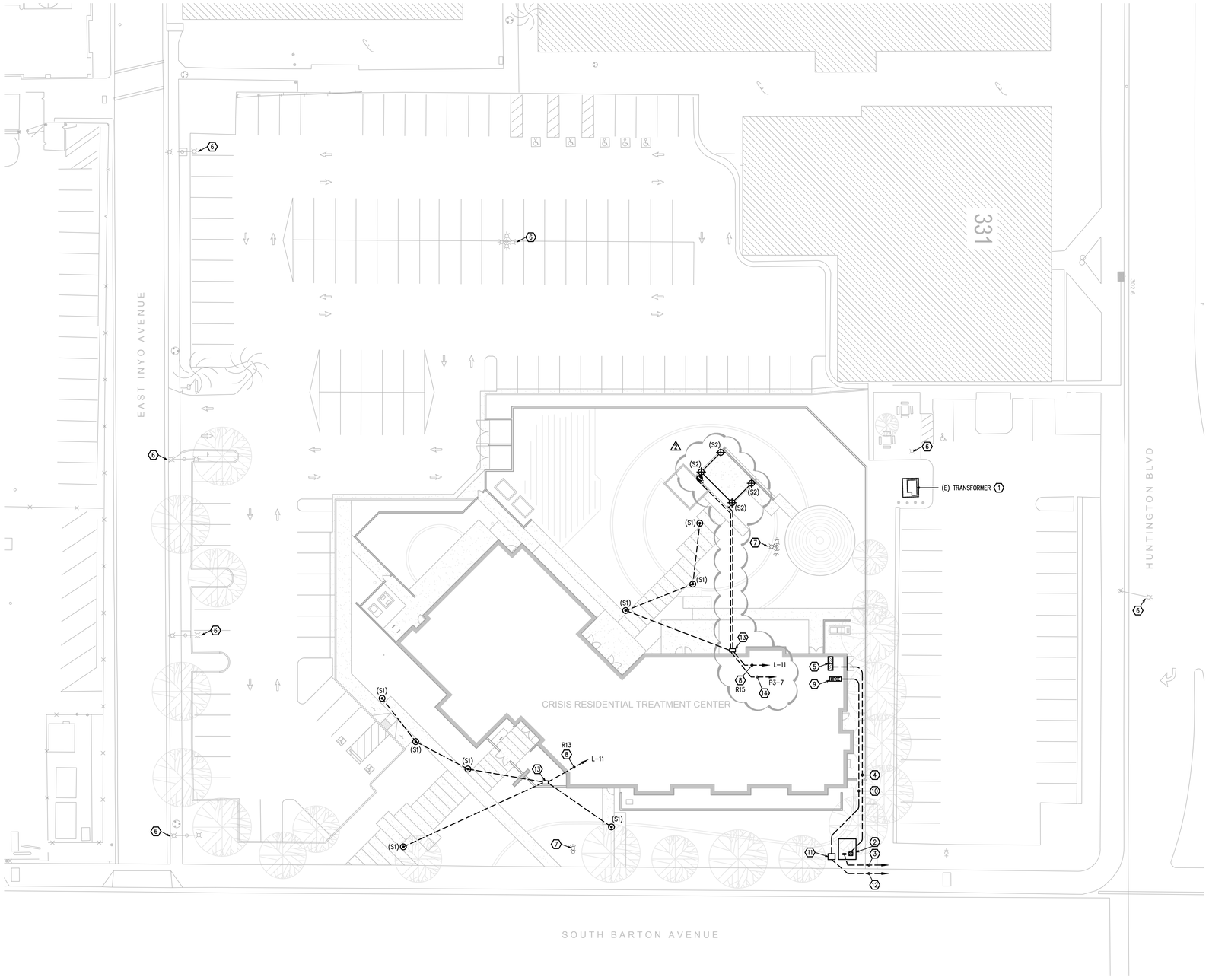
ELECTRICAL SCHEDULES

PROFESSIONAL ENGINEER C. SCOTT DAVIDSON E17850 ELECTRICAL STATE OF CALIFORNIA

Date:	9/2/16
Scale:	AS INDICATED
Drawn:	HDE
Job:	11503
Sheet Number	E-103

DRAWING KEY NOTES ⬡

1. EXISTING PG&E TRANSFORMER TO REMAIN.
2. PROPOSED PG&E TRANSFORMER AND CONCRETE PAD. PROVIDE SCREENING PER ARCHITECTURAL PLANS.
3. PROPOSED 4"C. PRIMARY TO PG&E POINT OF CONNECTION. VERIFY WITH RULE 16 DOCUMENTS.
4. PROPOSED (2) 5"C. SECONDARY.
5. MAIN SERVICE BOARD 'MS'.
6. EXISTING POLE LIGHT TO REMAIN.
7. DEMO EXISTING POLE LIGHT AND BASE. REMOVE CONDUCTORS TO LAST JUNCTION POINT.
8. HOMERUN VIA LCP. RELAY NOTED ON PLANS.
9. PROPOSED AT&T MPOE.
10. PROPOSED (2) 4"C. TEL. SERVICE CONDUITS.
11. PROPOSED AT&T PULLBOX.
12. PROPOSED (2) 4"C. TO AT&T POINT OF CONNECTION.
13. N9 PULLBOX. LIGHTING CIRCUIT SPLICES SHALL BE MADE WITH SUBMERSIBLE RATED SPLICE KITS.
14. RUN 2#10, 1#10G. TO GAZEBO OUTLET.



ELECTRICAL SITE PLAN

SCALE: 1" = 20'-0"

REVISIONS	BY
BACKCHECK 10/14/16	
⚠ ADDENDUM 2 11/10/16	

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Country of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno
Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

ELECTRICAL SITE PLAN

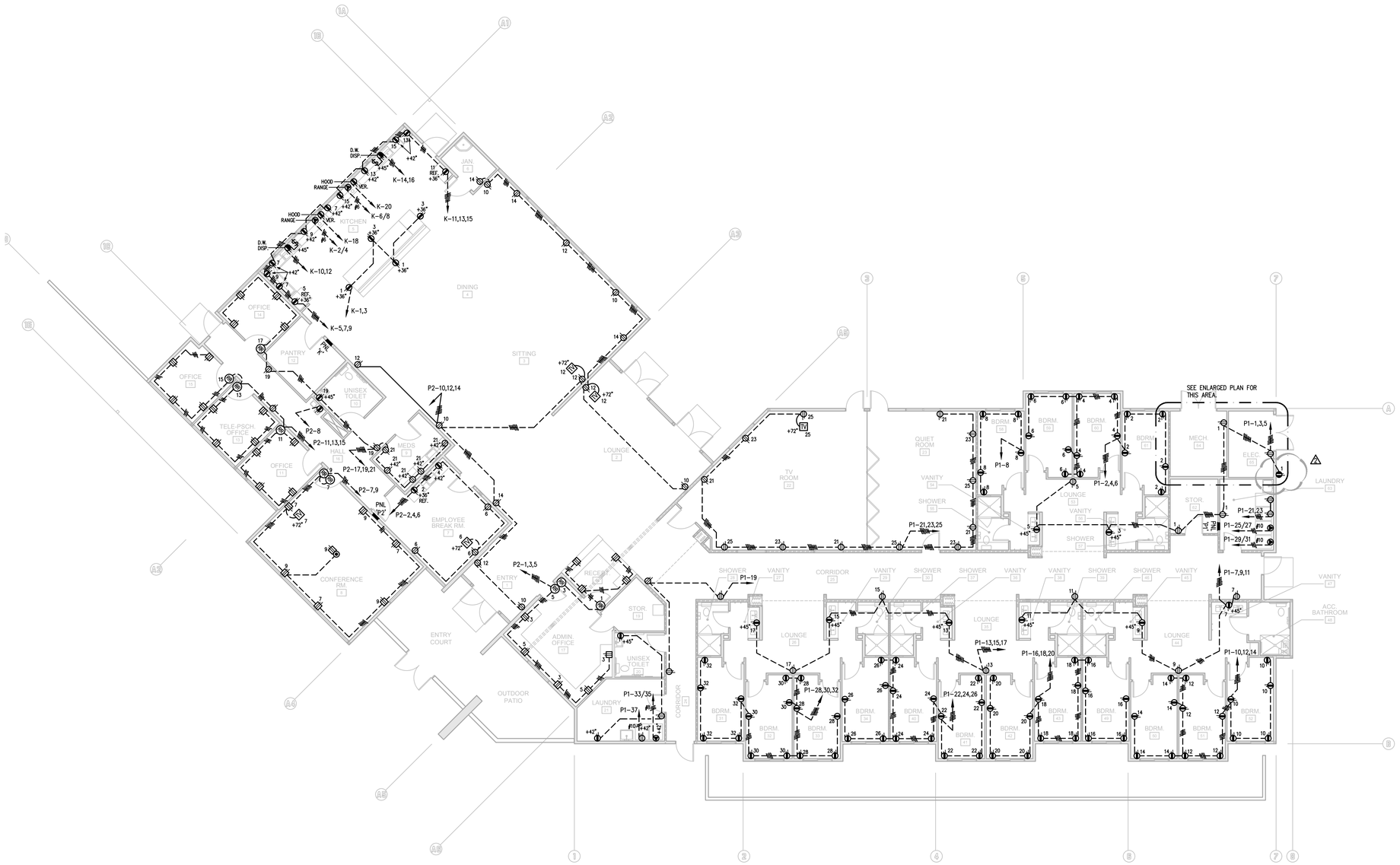
Date:	9/2/16
Scale:	AS INDICATED
Drawn:	HDE
Job:	11508
Sheet Number	E-201

REGISTERED PROFESSIONAL ENGINEER C. SCOTT DAVIDSON E17850 ELECTRICAL STATE OF CALIFORNIA

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356 Pollasky Ave., Suite 200
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DRAWING KEY NOTES

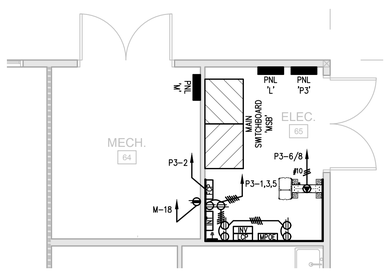
1. FIRE RESISTANT 3/4" PLYWOOD BACKBOARD AND PAINT. MOUNT FIRE ALARM, INTRUSION, AND TEL. ATTACH PLYWOOD TO WALL STUDS WITH #6 SCREWS AT 18" CENTERS. INSTALL OUTLETS AT +24" AFF AND +72" AFF.
2. MDF RACKS PER SPECS. PROVIDE 208V 30A OUTLET FOR UPS.
3. 12" COPPER COMMUNICATIONS GROUND BUS BAR. RUN #6 GREEN GROUND WIRE TO BUILDING GEC.
4. LIGHTING INVERTER FOR EXTERIOR. SEE LIGHTING PLAN. ISOLITE #IM-25-LC-V2-RT WITH SURFACE WALL MOUNT KIT, 250VA, 63LB.



NORTH

POWER PLAN

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



NORTH

ENLARGED ELEC, MECH RMS. PLAN

SCALE: 1/4" = 1'-0"

REVISIONS	BY
BACKCHECK 10/14/16	
⚠ ADDENDUM 2 11/10/16	

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interiors

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LICENSED ARCHITECT ROBERT C. SIEGRIST C-9651 REN. 10-31-17 STATE OF CALIFORNIA

Country of Fresno
2281 Tulare Street
Fresno, CA 93721

County of Fresno Crisis Residential Treatment Facility

496 S. Barton Avenue, Fresno, CA 93702

POWER PLAN

Date:	9/2/16
Scale:	AS INDICATED
Drawn:	HDE
Job:	11503
Sheet Number	E-302

REGISTERED PROFESSIONAL ENGINEER C. SCOTT DAVIDSON E17850 ELECTRICAL STATE OF CALIFORNIA

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559.323.4995 tel • 559.323.4928 fax

End of Addendum 2

ADDENDUM NO. 3

CONTRACT NO. 16-S-05

PROJECT

Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

Dated: 11-14-2016



11/14/16
Date Signed

Capital Projects Division Manager: _____

Stuart G. Seiden, #C18719
Lic. Expiration: 03/31/17

Fresno County Department of Public Works and Planning
2220 Tulare Street, 8TH Floor
Fresno, CA 93721-2104

The foregoing documents are amended in the respects as herein set forth. This addendum and the amendments herein shall become part of said documents and of any contract entered into pursuant to said documents.

PLEASE ACKNOWLEDGE THIS ADDENDUM ON PAGE 00 42 13- 2 OF THE PROJECT MANUAL. IF YOU HAVE GIVEN THE CONTRACT DOCUMENTS TO SOMEONE ELSE, PLEASE FORWARD THIS ADDENDUM.

A. BID FORMS AND CONTRACT CONDITIONS:

No Changes

B. SPECIFICATIONS:

No Changes

C. DRAWINGS:

No Changes

D. GENERAL CLARIFICATIONS

The Fire Detection and Alarm System will be provided and installed by the County. The Contractor shall coordinate installation.

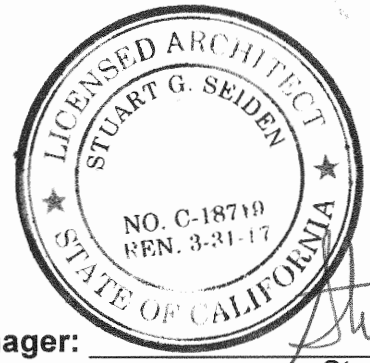
ADDENDUM NO. 4

CONTRACT NO. 16-S-05

PROJECT

Crisis Residential Treatment Facility
496 S. Barton Avenue, Fresno, CA 93702

Dated: 11-15-2016



11/15/16
Date Signed

Capital Projects Division Manager: _____

Stuart G. Seiden, #C18719
Lic. Expiration: 03/31/17

Fresno County Department of Public Works and Planning
2220 Tulare Street, 8TH Floor
Fresno, CA 93721-2104

The foregoing documents are amended in the respects as herein set forth. This addendum and the amendments herein shall become part of said documents and of any contract entered into pursuant to said documents.

PLEASE ACKNOWLEDGE THIS ADDENDUM ON PROPOSAL PAGE - 2 OF THE PROJECT MANUAL. IF YOU HAVE GIVEN THE CONTRACT DOCUMENTS TO SOMEONE ELSE, PLEASE FORWARD THIS ADDENDUM.

A. BID FORMS AND CONTRACT CONDITIONS:

1. NOTICE TO CONTRACTORS, Section 00 11 13:

DELETE the following text:

2:00 P.M., (1400 hours and 00 seconds)
Thursday, November 17, 2016

REPLACE WITH the following text:

2:00 P.M., (1400 hours and 00 seconds)
Friday, November 18, 2016

B. SPECIFICATIONS:

No Changes

C. DRAWINGS:

No Changes

D. GENERAL CLARIFICATIONS

No Changes

End of Addendum 4

Project: **Crisis Residential Treatment Facility (CRT)**

Contract No. **16-S-05**

Adopted by the Fresno County Board of Supervisors, October 18, 2016

Ernest Buddy Mendes, Chairman	4th District
Brian Pacheco, Vice Chairman	1st District
Andreas Borgeas	2nd District
Henry R. Perea	3rd District
Deborah A. Poochigian	5th District

Jean M. Rousseau, County Administrative Officer

Steven E. White, Director
Department of Public Works and Planning

LICENSED ARCHITECT
STUART G. SEIDEN
NO. C-18719
REN. 3-31-17
STATE OF CALIFORNIA

1/13/17
Date Signed

Capital Projects Division Manager: _____

Stuart G. Seiden, #C18719
Lic. Expiration: 03/31/17

Fresno County Department of Public Works and Planning
2220 Tulare Street, 8TH Floor
Fresno, CA 93721-2104

LICENSED ARCHITECT
ROBERT C. SIEGRIST
C-9651
REN. 10-31-17
STATE OF CALIFORNIA

10-17-16
Date Signed

Architect of Record: _____

Robert C. Siegrist, #C9651
Lic. Expiration: 10/31/17

Dyson Siegrist Janzen Architects, Inc.
1295 N. Wishon Avenue, Suite #101
Fresno, CA 93728



Date Signed

Structural Engineer:

Tel: (559) 323-1023
Fax: (559) 323-8090
Parrish Hansen, Inc.
418 Clovis Avenue
Clovis, CA 93612

Robert S. Parrish, #S2331
License Renewal 03/31/17



10.17.16
Date Signed

Mechanical Engineer:

Tel: (559) 437-0376
Fax: (559) 437-0297
Mechanical Design Concepts
1060 W. Sierra, Suite 101
Fresno, CA 93711

Stephen A. Becker, #M16029
License Renewal 12/31/17



10/17/2016
Date Signed

Electrical Engineer:

Tel: (559) 323-4995
Fax: (559) 323-4928
Hardin Davidson Engineering
356 Pollasky Avenue, Suite 200
Clovis, CA 93612

C. Scott Davidson, #E17850
License Renewal 6/30/18



10/18/16
Date Signed

Civil Engineer: _____

Lane R. Bader, #47033
License Renewal 12/31/17

Tel: (559) 326-1400
Fax: (559) 326-1500
Blair, Church & Flynn
451 Clovis Avenue, Suite 200
Clovis, CA 93612



10-17-16
Date Signed

Landscape Architect: _____

Paul M. Saito, #LA1111
License Renewal 10/02/18

Tel: (559) 227-5494
Fax: (559) 222-5658
Paul Saito Landscape Architect
1295 N. Wishon Avenue, Suite 201
Fresno, CA 93728

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MDC

MECHANICAL DESIGN CONCEPTS, INC.

1060 W. Sierra, Suite 101
Fresno, CA 93711
Phone: (559) 437-0376
Fax: (559) 437-0297

Stephen A. Becker, P.E.
Michael D. Cantelmi, P.E.

November 10, 2016

15037

Mayuko Russell
DSJ Architects
1295 N. Wishon Avenue
Fresno, CA 93728

Project: Crisis Residential Treatment Facility

Dear Ms. Russell:

Please issue the following items in your next published addendum for this project:

PLUMBING DRAWINGS

1. Refer to Sheet P-300: Add Emergency Drain ED-1 to the Plumbing Fixture Schedule. Jay R. Smith 2005Y02.

MECHANICAL DRAWINGS

1. Refer to Sheet M-101: Remove the note regarding a fire/smoke damper at Lounge 26.

2. Refer to Sheet M-101: At Detail A – delete the "H" hexagon. The louver will be called for as an accessory to the doors – refer to Door Schedule.

3. Refer to Sheet M-301: At Detail E, change the 12" vertical dimension to 12" minimum. At Detail J, the KBTZ anchors shall be tested per the note in Detail F. At Detail K, the anchors shall be Hilti KBTZ – and shall be tested per the note in Detail F.

SPECIFICATIONS

1. Refer to Sections 230800 and 250900. Both Energy Recovery Ventilators shall include the following accessories: 1) Two filter pressure drop sensors – one for the outside air and one for the exhaust air. These sensors shall send status and alarm signals to the energy management system (EMS). 2) Two fan status points which shall be reported to the EMS.

Sincerely,



Stephen A. Becker, P.E.

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BOARD OF SUPERVISORS COUNTY OF FRESNO STATE OF CALIFORNIA

N O T I C E T O B I D D E R S

Sealed proposals will be received at the Fresno County Department of Public Works and Planning, Office of the Design Engineer, Seventh Floor, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721 until

2:00 P.M., (1400 hours and 00 seconds)
Thursday, November 17, 2016

at which time the bidding will be closed. Promptly following the closing of the bidding, all timely submitted bids will be publicly opened and read at the Department in said building, for construction in accordance with the specifications therefor, to which special reference is made as follows:

CRISIS RESIDENTIAL TREATMENT FACILITY (CRT)

496 SOUTH BARTON AVENUE
FRESNO, CA 93702
Contract No. 16-S-05

The work to be done consists of new construction of the Crisis Residential Treatment Facility, parking and associated site improvements. The project consists of a wood-framed, single-story building of approximately 11,700 square feet on a site of approximately 1.2 acres.

A pre-bid conference will be held at **3 p.m.**, on **WEDNESDAY, NOVEMBER 2, 2016**. A discussion of the project will be held and the project site will be open for examination. Contractors should meet at KINGS CANYON CAMPUS, PARKING LOT 'K', located west of South Barton Ave. and south of Huntington Blvd. Attendance at the pre-bid conference is not mandatory; however, the scheduled pre-bid will be the only opportunity for prospective bidders to visit the site in the presence of County staff and requests for individual site visits with County staff will not be granted.

The County of Fresno is committed to increasing the availability of employment and training opportunities, and requires that the Contractor and each subcontractor employed on this Project shall use their best efforts to ensure that thirty-three percent (33%) of apprentice hours are performed by qualified participants in state approved apprenticeship programs who also are current or former "Welfare-to-Work" participants in the CalWORKs program. Attention is directed to "Apprentices" in Section 2.55 of the General Conditions.

Incentives whereby the Contractor or subcontractor receives partial reimbursement for the wages paid to apprentices who qualify may be available. The incentive program is administered by the County of Fresno, Department of Social Services, Employment Resource Center. For questions regarding the incentive program, contact the Employment Resource Center at (559) 600-5370.

Planholder and exchange/publication names may be obtained from the Fresno County website at **http://www.co.fresno.ca.us/planholders**.

Electronic copies (in ".pdf" file format) of the official project plans and specifications and such additional supplemental project information as may be provided, are available to view, download, and print at **http://www.co.fresno.ca.us/planholders**.

Project plans and specifications will not be sold to prospective bidders in hardcopy format except upon special written request to DesignServices@co.fresno.ca.us. A payment to the Department in the amount of $300 will be required for each set of plans and specifications.

A Summary of Bids and a list of subcontractors for the apparent low bidder will be posted at the above listed website, generally within 24 hours of the Bid Opening.

All requests for substitutions (refer to Section 01 25 00, Substitution Procedures) and questions regarding this project shall be in writing and shall be received by the Department of Public Works and Planning, Design Division, no later than 2:00 P.M. on the fourteenth (14th) calendar day prior to bid opening. All substitution requests and questions received after this deadline will not receive a response unless the Department of Public Works and Planning elects to issue an addendum to revise the bid opening date. In the event that the bid opening date is revised, the deadline for substitution requests and questions will be extended to no later than 2:00 P.M. on the fourteenth (14th) calendar day before the revised bid opening date. Questions shall be submitted on the "CONTRACTOR REQUEST FOR CLARIFICATION" form provided in the Section 00 63 19 of the Project Manual. Fax substitution requests and questions to (559) 455-4609, e-mail to designservices@co.fresno.ca.us
or mail to:

County of Fresno
Department of Public Works and Planning
2220 Tulare Street, Sixth Floor
Fresno, Ca. 93721-2104

Any changes to, or clarification of, the project plans and specifications, including approved substitutions, shall be in the form of a written addendum issued to planholders of record. Questions that prompt a change or clarification shall be included in the addendum with the subsequent answer.

Any oral explanation or interpretations given to this project are not binding.

Bids shall be submitted in a sealed, opaque envelope addressed to the Department and labeled with the name of the bidder, the name of the project and the statement 'Do Not Open Until The Time Of Bid Opening.'

Bid security in the amount of ten (10) percent of the amount of the bid, and in the form of a bid bond issued by an admitted surety insurer licensed by the California Department of Insurance, cash, cashier's check or certified check shall accompany the bid. Bid security shall be made in favor of the County of Fresno.

No contract will be awarded to a contractor who has not been licensed in accordance with the provisions of the Contractors State License Law, California Business and Professions Code, Division 3, Chapter 9, as amended, or whose bid is not on the proposal form included in the contract document. A valid California

Contractor's License, **Class B, General Building Contractor**, is required for this project.

Asbestos certification from the Contractors State License Board and registration with the Division of Occupational Safety and Health is not required to bid this project. [Health and Safety Code 25914.2]

The Contractor and his subcontractors shall comply with all applicable statutes and regulations, and all provisions of Sections 2.51, 2.52 and 2.55 of the General Conditions, regarding payment of wages, hours of work and all other labor compliance issues.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at County of Fresno, Department of Public Works and Planning, 2220 Tulare Street, Sixth Floor, Fresno CA 93721-2104 and available from the California Department of Industrial Relations' Internet web site at http://www.dir.ca.gov/DLSR/PWD. Future effective general prevailing wage rates, which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

This project shall be subject to monitoring and enforcement by the County of Fresno and the Department of Industrial Relations (DIR), including the obligation to submit certified payroll records to the County of Fresno and directly to the DIR Compliance Monitoring Unit (CMU) at least monthly using the CMU's eCPR system. Detailed information may be obtained on the State of California's Department of Industrial Relations website, http://www.dir.ca.gov/public-works/publicworks.html.

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Bids are required for the entire work described herein, including a bid for the base bid and a bid for each of the alternate bids. Bids will be compared, for purposes of identifying the apparent low bidder for proposed award of the project, on the basis of the sum total of the base bid plus all of the alternate bids; provided, however, that the ultimate scope of the project, as subsequently determined by the Board of Supervisors at the time of award, may or may not include all or any of the alternate bids.

In addition to the bid bond required by law of all bidders on public works projects, the successful bidder shall furnish a faithful performance bond, a payment bond and a warranty bond in accordance with the provisions of Section 2.36 of the General Conditions. The faithful performance bond and the payment bond each shall be in the amount of 100 percent of the contract amount. Each bond specified in this Notice shall meet the requirements of all applicable statutes, including but not limited to those specified in Public Contract Code section 20129 and Civil Code section 9554.

Each bond specified in this Notice shall be issued by a surety company designated as an admitted surety insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and acceptable to the County of Fresno. Bidders are cautioned that representations made by surety companies will be verified with the California Department of Insurance. Additionally, the County of Fresno, in its discretion, when determining the sufficiency of a proposed surety company, may require the surety company to provide additional information supported by documentation. The County generally requires such information and documentation whenever the proposed surety company has either a Best's Key Rating Guide of less than **A** and a financial size designation of less than **VIII**. However, the County expressly reserves its right to require all information and documentation to which the County is legally entitled from any proposed surety company.

Bids shall include the following sole source items as approved by the Fresno County Board of Supervisors:

ITEM	**MANUFACTURER**
Door Hardware	
Lock cylinders, deadbolts and locksets	Schlage
Exterior hinges	Roton 780-112H
Door holders, exterior door pulls/strike protector	Trimco
Door closers	Norton 8000 series
Plumbing Fixtures	
Sink and lavatory faucets	Chicago Faucet
Shower mixing valves	Powers
Shower valves	Acorn
Reduced pressure prevention device (RPP)	Febco
Energy Management System	Metasys by Johnson Controls

Pursuant to Public Contract Code Section 22300, substitution of securities for any moneys withheld by the County of Fresno to ensure performance under the contract shall be permitted.

The Board of Supervisors reserves the right to reject any or all bids.

Board of Supervisors, County of Fresno

Jean M. Rousseau, County Administrative Officer

Dated: October 18, 2016 By: Bernice E. Seidel, Clerk to the Board

INSTRUCTIONS TO BIDDERS

1.01 EXPLANATION TO BIDDERS

An explanation desired by bidders regarding the meaning or interpretation of the drawings and specifications must be requested in writing and with sufficient time allowed for a reply to reach them before the submission of their bids.

Oral explanations given before the award of the contract will not be binding. Any interpretation made will be in the form of an addendum to the specifications or drawings, said addendum will only be issued by the Director. A copy of the addendum will be furnished to each planholder and its receipt shall be acknowledged on the Bid Proposal.

1.02 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK

The bidder is required to examine carefully the site of the proposed work, the proposal, plans, specifications, special provisions and contract forms for submitting a proposal. It is mutually agreed that the submission of a proposal shall be considered prima facie evidence that the bidder has made such examination and is satisfied with the conditions to be encountered in performing the work and as to the requirements of the plan, specifications and special provisions of the contract.

1.03 PROPOSAL GUARANTEE

The bidder shall furnish a proposal guarantee consisting of a bid bond, cash, certified check, or cashier's check for ten percent (10%) of the total amount bid, including additives.

In case security is in the form of a certified check or cashier's check, the Owner may make such disposition of same as will accomplish the purpose of which submitted. Checks deposited by unsuccessful bidders will be returned as soon as practicable after the bid opening.

1.04 PREPARATION OF PROPOSALS

The bidder shall prepare his proposal on the blank proposal form furnished by the Owner. The bidder shall specify a lump sum price in both words and figures for each bid item, including alternates, additives and supplemental items.

All words and figures shall be in ink. In case of a discrepancy between the prices written in words and those written in figures, the written words shall govern.

Alternate or conditional bids will not be accepted unless called for in the Special Provisions.

The bidder's proposals shall be signed in ink by the individual, by one or more partners of the partnership, or by one or more of the officers of the corporation submitting it. If the proposal is made by an individual, his name and post office address must be shown. If made by a partnership, the name of each member of the partnership must be shown. If made by a corporation, the proposal must show the name of the state under which the corporation was chartered and the name of the president, vice president, secretary and treasurer.

The required proposal guaranty must accompany the proposal.

1.05 SUBCONTRACTORS

Every person submitting a bid to perform the work called for in the bid request shall set forth in his bid:

a. The name and the location of the place of business, and the California contractor's license number of each subcontractor who will perform work or labor or render service to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half (1/2) of one percent (1%) of the general contractor's total bid, and

b. The portion of the work which will be done by each subcontractor.

The attention of bidders is directed to the provisions of Public Contract Code Section 4100 et seq which set forth the consequences and possible penalties which may result from a failure to comply strictly with the foregoing requirements for listing of subcontractors.

The attention of bidders is also directed to Section 1-1.16, Post-Bid/Pre-Award Information, of these Instructions to Bidders.

1.06 SUBMISSION OF PROPOSAL

Each proposal shall be submitted in a sealed envelope labeled to clearly indicate the project and contents.

When sent by mail, a sealed proposal must be addressed to the Fresno County Department of Public Works and Planning, Office of the Design Engineer, Sixth Floor, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721. All proposals shall be filed prior to the time and at the place specified in the NOTICE TO CONTRACTORS. Proposals received after the time for opening of the proposals will be returned to the bidder unopened.

1.07 IRREGULAR PROPOSALS

Proposals shall be considered irregular and may be rejected for the following reasons:

a. If the proposal forms furnished by the Owner are not used or are altered.

b. If there are unauthorized additions, conditional or alternate proposals or irregularities of any kind which tend to make the proposal incomplete or indefinite.

c. If the bidder adds any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.

d. If the bid fails to contain a price for each item.

1.08 DISQUALIFICATION OF BIDDERS

Any one or more of the following causes may be considered as sufficient for disqualification of a bidder and rejection of his proposal or proposals:

a. More than one proposal for the same work from an individual, partnership or corporation.

b. Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the Owner until such participant shall have been reinstated as a qualified bidder.

c. Lack of competency and adequate machinery, plant or other equipment, as may be revealed by financial statement if required.

d. For unsatisfactory performance record as shown by past work for the Owner, judged from the standpoint of workmanship and progress.

e. Prior commitments or obligations which in the judgment of the Owner might hinder or prevent the prompt completion of the work.

f. Failure to pay, or satisfactorily settle, all bills due for labor or materials on former contracts in force at the time of letting the bid.

g. Failure to comply with any qualification regulation of the Owner.

h. Omission of proposal guaranty.

1.09 WITHDRAWAL OR REVISION OF PROPOSALS

A bidder may, without prejudice, withdraw a proposal after it has been deposited, provided the request for such withdrawal is received in writing the time set for opening proposals. The request shall be executed by the bidder or the bidder's duly authorized representative and shall include the name of the individual authorized to receive the withdrawn proposal. Said individual shall be required to present photo identification prior to withdrawing the proposal. The bidder may then submit a revised proposal provided it is received prior to the time set for opening proposals.

1.10 PUBLIC OPENING OF PROPOSALS

Proposals will be opened and read publicly at the time and place indicated in the Notice to Contractors. Bidders or their authorized agents are invited to be present.

1.11 RELIEF OF BIDDER

A bidder who claims a mistake in his bid must follow the procedures in Public Contract Code Section 5100 et seq in seeking relief of his bid.

1.12 AWARD OF CONTRACT

The award of contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. The award, if made, will be within 54 days after the opening of proposals.

If the Owner finds that it will be unable to award the contract within 54 calendar days after the opening of proposals, the Director may request any or all bidders to extend all terms of their proposal(s) to a specified date. Additional such extensions may possibly be requested. If a bidder does not elect to extend the terms of his or her proposal beyond the 54 calendar days following opening of proposals, or does not respond within 10 days to a request for an extension, that bidder's proposal will be deemed as having expired 54 calendar days following opening of the proposals, and that bidder's proposal will not be considered for award of the contract.

The successful bidder will be notified by letter, mailed to the address shown on his proposal, that his bid has been accepted and that he has been awarded the contract.

The right is reserved to reject any or all proposals, to waive technicalities, to advertise for new proposals, or to proceed to do this work otherwise, if in the judgment of the awarding authorities the best interests of the Owner will be promoted thereby.

1.13 CANCELLATION OF AWARD

The awarding authority reserves the right to cancel the award of any contract at any time before the execution of said contract by all parties without any liability against the Owner.

1.14 CONTRACT BONDS

The bidder to whom award is made shall, within ten days, enter into a written contract with the Owner. The bidder shall forfeit the proposal guarantee in case he does not follow through with the contract within ten days after the contract is awarded.

The successful bidder shall furnish a faithful performance bond in the amount of 100 percent of the contract amount and a payment bond in the amount of 100 percent of the contract amount; said bonds shall be submitted in triplicate.

The payment bond shall contain provisions such that if the Contractor or his subcontractors shall fail to pay (a) amounts due under the Unemployment Insurance Code with respect to work performed under the contract, or (b) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from the wages of the employees of the Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then the surety will pay these amounts. In case suit is brought upon the payment bond, the surety will pay a reasonable attorney's fee to be fixed by the court.

The contract form is attached hereto for the Contractor's information only. Execution of the contract by bidders will not be required, until after the bid award is made. Liability and Workers Compensation Insurance requirements shall be as set forth in the Agreement.

1.15 BUILDERS RISK INSURANCE

Unless otherwise provided, the Contractor shall obtain and maintain in force Builder's Risk insurance against loss or damage from all perils. The policy shall cover the entire structure on which the work of this contract is to be done, up to the full insurable value thereof (except that if the contract is for remodeling, alteration, repair, or maintenance, then the policy shall cover the value of the contract therefore), including items of labor and materials connected therewith on the site, materials in place or to be used as part of the permanent construction including materials stored and partially paid for by the Owner as provided in Section 2.11, surplus materials, shanties, protective fences, bridges, or temporary structures, miscellaneous materials and supplies incident to the work, and such scaffolding, stagings, towers, forms and equipment as are not owned or rented by the Contractor, the cost of which is included in the cost of the work. EXCLUDED: This insurance does not cover any tools owned by mechanics, any tools, equipment, scaffolding, staging, towers, and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work, or any structures erected for the Contractor's administration of the project.

All subcontractors shall be insured to the extent of their portion of the work under the Contractor. The Contractor shall request, and is responsible to confirm with its insurer, that the Owner and all subcontractors are named, both as additional insured and as additional loss payees, on the Builder's Risk insurance policy. The Owner, Contractor and all subcontractors waive all rights, each against the others, for damages arising from perils covered by the insurance required under the terms of this article, except such rights as they may have to the proceeds of the Builder's Risk insurance obtained and maintained by the Contractor. The Contractor shall file a certificate of such insurance with the Owner upon issuance of the policy, and with any subcontractors upon its request.

1.16 POST-BID / PRE-AWARD INFORMATION

Within eight calendar days after bid opening, the apparent low bidder shall submit the following information to the Engineer:

a. A cost distribution of the bid, with costs shown for major items of work as defined by either the project specification index, the Uniform Construction Index (UCI), or other method as appropriate for the project and approved by the Engineer.

b. The cost distribution shall distinguish between work to be done by the bidder's own forces and work that will be subcontracted (including those who are to furnish materials or equipment fabricated to a special design); all subcontractors shall be named, regardless of the dollar amount of subcontracted work. Bidders' attention is also directed to California Public Contract Code Section 4100 et seq regarding subcontracting.

c. Any qualification statement, list of projects, or other material required by specification documents for the purpose of evaluating the competency and qualifications of either the apparent low bidder, or the listed subcontractors and suppliers. Such qualification statements may be in addition to statements required to be submitted with the proposal. Such qualification statements shall be supplemented with additional material, if required by the Engineer.

d. The Engineer reserves the right to reject any proposed subcontractor, installer, or supplier who cannot show satisfactory evidence of meeting the qualifications required by the specification documents. In the event of such rejection, the apparent low bidder shall, within five working days, submit the name and qualifications of a replacement subcontractor, installer or supplier satisfactory to the Engineer. Such replacement submittal shall be in accordance with all specification requirements.

e. No adjustment of bid prices shall be made in the event of such replacement.

This information may be used in the evaluation of bids. If the project is awarded, the cost distribution will be used in determining amounts payable on progress payments and final payment.

The Engineer may request that bidders other than the apparent low bidder submit similar cost distribution or qualification information, for the purpose of evaluating bids.

Upon completion of the bid evaluation process, cost distributions or qualification information submitted by other than the apparent low bidder will be returned upon request.

BIDDER'S CHECKLIST (BUILDING PROJECTS)

Because of numerous technical irregularities resulting in rejected proposals for recent projects, the following checklist is offered for the bidders' information and use in preparing the proposal. This checklist is not to be considered as part of the contract documents. Bidders are cautioned that deleting or not submitting a form supplied in the bid documents (even if the form does not require signature) may result in an irregular bid.

PROPOSAL/BID SHEET (Page 00 42 13-2)

Bidder name on each sheet. Price for each item. Price for additive, deductive, supplemental or alternate items. Make no additions such as "plus tax", "plus freight", or conditions such as "less 2% if paid by 15th". Use ink or typewriter. Acknowledge addenda.

BID SECURITY FORM - READ THE NOTICES AND NOTES (Page 00 43 13-1)

Indicate type of bid security provided.
Provide contract license information.

State business name and if business is a:

- Corporation - list officers
- Partnership - list partners
- Joint Venture - list members; if members are corporations or partnerships, list their officers or partners.
- Individual - list Owner's name and firm name style

Signature of Bidder - Bid Must Be Signed!

- Corporation - by an officer
- Partnership - by a partner
- Joint Venture - by a member
- Individual - by the Owner
- If signature is by a Branch Manager, Estimator, Agent, etc., the bid must be accompanied by a power of attorney authorizing the individual to sign bids, otherwise the bid may be rejected.

Business Address - Firm's Street Address

Mailing Address - P.O. Box or Street Address

BID SECURITY (PROPOSAL GUARANTEE)

Ten percent (10%) of the total amount bid (to include supplemental or additive items).

Type of Bid Security:

Cash - Not recommended; cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.

Cashier's or Certified Checks - Will be held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract bonds are submitted and approved.

Bid Bonds - Must be signed by the bidder and by the attorney-in-fact for the bonding company. Signature of attorney-in-fact should be notarized and the bond should be accompanied by bonding company's affidavit authorizing attorney-in-fact to execute bonds. An unsigned bid bond will be cause for rejection.

SUBCONTRACTOR LIST (Pages 00 43 36-1 to 00 43 36-7)

One firm for each type of work to be subcontracted. Fill out as completely as possible. Name, location of place of business, California contractor's license number and description of work for each subcontractor required to be listed is required.

NON COLLUSION AFFIDAVIT (Page 00 45 19-1)

Must be completed, signed, and returned with bid.

GUARANTY (Page 00 65 36-1)

Optional for bidder to complete and return with bid.

OTHER

If you remove the forms from the specifications booklet, please staple the pages together.

Make sure your bid envelope is sealed and shows the project name.

If you mail your bid, allow time for postal delay. Bids received after the set time will be returned unopened. Be sure the statement "Do Not Open Until Time of Bid Opening", is on the envelope.

PROPOSAL TO THE BOARD OF SUPERVISORS

COUNTY OF FRESNO

Crisis Residential Treatment Facility (CRT)

Work to be performed: **Construction of new Crisis Residential Treatment Facility**

Building No. **TBD**

496 South Barton Avenue
Fresno, CA 93702
Contract No.: 16-S-05

State Grant Program and Project No.:

Fund / Subclass / Org / Account / Program or Memo Nos.:
0400 / 10051 / 8851 / 8150 /91191 year 2016

In case of a discrepancy between words and figures, the words shall prevail.

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Awarding Authority, within ten (10) days after the award of the contract, the Awarding Authority, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the Owner.

The undersigned, as bidder declares that all Addenda issued with respect to this bid have been received and incorporated into this Proposal. The bidder's signature on this Proposal also constitutes acknowledgement of all addenda.

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; that he has carefully examined the location of the proposed work, the annexed proposed form of contract, and the plan therein referred to; and he proposes and agrees if this proposal is accepted, that he will contract with the County of Fresno to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the following lump sum price, to-wit:

BIDDER: ZUMWALT CONSTRUCTION, INC.

Contract No.: 16-S-05 **Project:** Crisis Residential Treatment Facility (CRT)	
Lump Sum Price Written In Words	
1) Base Bid four million four hundred Sixteen thousand two Dollars	hundred seventy seven $4,416,277
2) Additive Bid 1 – Labyrinth. Base bid is top soil ~~one thousand six hundred and thirty three~~ ~~four thousand one hundred and no/100~~ Dollars	1,633 ~~$4,100~~
3) Additive Bid 2 – Pavilion Structure including foundations, slab, framing, roof and the CMU wall. Base bid will be exterior concrete walk poured where slab is indicated. ~~sixty six thousand ninety eight~~ Sixty five thousand and twenty four Dollars	66,098 ~~$65,024~~
4) Additive Bid 3 – Wood Framed Glass Partition between Room 22 (Exercise Room) and Room 23 (Reading Room) and the frameless glass above the glue-lam beam. Base bid is to have no separation between the two rooms. The beam will remain in the base bid. ~~twenty eight thousand two hundred~~ ninety three ~~twenty eight thousand four hundred twenty eight~~ Dollars	28,293 ~~$28,428~~
5) Additive Bid 4 – Wood Acoustic Panels and the supporting hat channels above the Dining Room. Base bid is to finish with Gyp. Board directly below the roof rafters. ~~fifty five thousand nine hundred twenty eight~~ ~~fifty seven thousand one hundred fifty eight~~ ~~fifty six thousand one hundred ninety five~~ Dollars	55,928 ~~$56,195~~ ~~$57,158~~
6) Total Bid - (1 + 2 + 3 + 4 + 5) four million five hundred sixty eight thousand two hundred twenty ~~eight~~ nine Dollars	$ 4,568,229
Acknowledgement of Addendum: Addendum No. 1 Dated 11/9/16 Addendum No. 3 Dated 11/14/16 Addendum No. 2 Dated 11/10/16 Addendum No. 4 Dated 11/15/16	

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

Accompanying this proposal is security (check one only) in amount equal to at least ten percent (10%) of the total amount of the bid:

Bid Bond (X); Certified Check ( ); Cashier's Check ( ); Cash ($_____)

The names of all persons interested in the foregoing proposal as principals are as follows:

IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if bidder or other interested person is an individual, state first and last name in full.

FIRM NAME ZUMWALT CONSTRUCTION, INC.

KURT E. ZUMWALT - PRESIDENT

Licensed in accordance with an act providing for the registration of Contractors,

Class B License No. 706140 Expires _____

(Furnishing Contractor License information as part of this proposal is optional and is requested to facilitate verification of licensure)

Signature of Bidder — Dated 11/17/16

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, his signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

BUSINESS ADDRESS: 5520 E. LAMONA AVE, FRESNO, CA 93727 (Zip Code)

MAILING ADDRESS: 5520 E. LAMONA AVE, FRESNO, CA 93727 (Zip Code)

BUSINESS PHONE: (559) 252-1000 FAX NUMBER: (559) 252-1005

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BID BOND **TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA**
Hartford, Connecticut 06183

KNOWN ALL BY THESE PRESENTS, That we, Zumwalt Construction, Inc. , as Principal, and Travelers Casualty and Surety Company of America, as Surety, are held and firmly bound unto The County of Fresno, as Obligee, in the sum of Ten Percent of the Bid Amount Dollars ($10% of the Bid Amount) for the payment of which we bind ourselves, and our successors and assigns, jointly and severally, as provided herein.

WHEREAS, Principal has submitted or is about to submit a bid to the Obligee on a contract for Crisis Residential Treatment Facility ("Project").

NOW, THEREFORE, the condition of this bond is that if Obligee accepts Principal's bid, and Principal enters into a contract with Obligee in conformance with the terms of the bid and provides such bond or bonds as may be specified in the bidding or contract documents, then this obligation shall be void; otherwise Principal and Surety will pay to Obligee the difference between the amount of Principal's bid and the amount for which Obligee shall in good faith contract with another person or entity to perform the work covered by Principal's bid, but in no event shall Surety's and Principal's liability exceed the penal sum of this bond.

Signed this 10th day of November, 2016.

Zumwalt Construction, Inc.
(Principal)

By: _____
Kurt E. Zumwalt, President

Travelers Casualty and Surety Company of America

By: _____
Gary E. Richards, Attorney-in-Fact

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

County of Fresno)

On 11/10/16 before me, Danette Cody, Notary Public,
(insert name and title of the officer)

personally appeared Gary E. Richards,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DANETTE CODY
NOTARY PUBLIC - CALIFORNIA
COMMISSION # 2051471
FRESNO COUNTY
My Comm. Exp. January 8, 2018

Signature Danette Cody

(Seal)

---------- Optional Information ----------

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgement to an unauthorized document.

Description of Attached Document

The preceding Certificate of Acknowledgement is attached to a document titled/for the purpose of Zumwalt Construction, Inc., Bid bond for The County of Fresno,

containing 1 pages and dated 11/10/16.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

TRAVELERS

POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 228807

Certificate No. 006812197

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Christina Piona, Shelly Weldon, Jeanie Swan, Christine Emmons, Gary E. Richards, Danette Cody, and John Samarin

of the City of Fresno, State of California, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 25th day of May, 2016.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

State of Connecticut
City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the 25th day of May, 2016, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2021.

MARIE C. TETREAULT NOTARY PUBLIC CONNECTICUT

_____
Marie C. Tetreault, Notary Public

58440-5-16 Printed in U.S.A.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 10th day of November, 20 16

Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTORS

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of **one-half of one percent of the total bid presented herewith.** Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board. Submission of subcontractor's name, location of business and description of work, and their California contractor's license number is REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

SUBCONTRACTOR: JMA
Item No. or Description of Work: CONCRETE/BUILDING
Dollar Amount or Percentage of Total Bid _____
Business Address: Sanger CA
Class _____ License No. 996535 DIR Registration No. 1000002784

SUBCONTRACTOR: ~~Showtime Concrete~~
Item No. or Description of Work: ~~Site Concrete~~
Dollar Amount or Percentage of Total Bid _____
Business Address: ~~Fresno CA~~
Class _____ License No. ~~877691~~ DIR Registration No. ~~1000010875~~

SUBCONTRACTOR: Dorfmeier
Item No. or Description of Work: Masonry
Dollar Amount or Percentage of Total Bid .034
Business Address: Fresno CA
Class C29 License No. 861556 DIR Registration No. 1000002453

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTOR: CASCO FAB
Item No. or Description of Work: Structural Steel
Dollar Amount or Percentage of Total Bid .030
Business Address: Fresno CA
Class C51 License No. 433448 DIR Registration No. 1000000615

SUBCONTRACTOR: Architectural Wood Design
Item No. or Description of Work: Case work
Dollar Amount or Percentage of Total Bid .029
Business Address: Fresno CA
Class C6 License No. 780334 DIR Registration No. 1000019022

SUBCONTRACTOR: Sacramento Building Products
Item No. or Description of Work: Insulation
Dollar Amount or Percentage of Total Bid .004
Business Address: West Sacramento CA
Class C2 License No. 202026 DIR Registration No. 1000005805

SUBCONTRACTOR: Graham Puett
Item No. or Description of Work: Roofing
Dollar Amount or Percentage of Total Bid .038
Business Address: Fresno CA
Class C39 License No. 793065 DIR Registration No. 1000027197

SUBCONTRACTOR: San Joaqun Glass
Item No. or Description of Work: Glass
Dollar Amount or Percentage of Total Bid .037
Business Address: Fresno CA
Class C17 License No. 248167 DIR Registration No. 1000010471

SUBCONTRACTOR: Carson Construction
Item No. or Description of Work: Plaster
Dollar Amount or Percentage of Total Bid .043
Business Address: Fresno CA
Class C35 License No. 710858 DIR Registration No. 1000003306

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC

SUBCONTRACTOR: JMC Drywall
Item No. or Description of Work: Drywall
Dollar Amount or Percentage of Total Bid .027
Business Address: Clovis CA
Class C9 License No. 986572 DIR Registration No. 1000005 1

SUBCONTRACTOR: J D Ballard
Item No. or Description of Work: Tile
Dollar Amount or Percentage of Total Bid .018
Business Address: Fresno CA
Class C54 License No. 297024 DIR Registration No. 1000002729

SUBCONTRACTOR: Ceiling Experts
Item No. or Description of Work: Ceiling work
Dollar Amount or Percentage of Total Bid .013
Business Address: Sacramento CA
Class C2 License No. 917629 DIR Registration No. 1000006305

SUBCONTRACTOR: ~~Michael Flooring~~
Item No. or Description of Work: ~~Flooring~~
Dollar Amount or Percentage of Total Bid
Business Address: ~~Bakersfield CA~~
Class _____ License No. ~~874947~~ DIR Registration No: ~~1000017104~~

SUBCONTRACTOR: Rosperich Painting
Item No. or Description of Work: Painting
Dollar Amount or Percentage of Total Bid .007 A: .900
Business Address: Sanger CA
Class C33 License No. 757058 DIR Registration No. 1000000284

SUBCONTRACTOR: Wilson Fire Sprinklers
Item No. or Description of Work: Fire Sprinklers
Dollar Amount or Percentage of Total Bid .107
Business Address: Selma CA
Class C16 License No. 899212 DIR Registration No. 1000008581

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC

1 **SUBCONTRACTOR:** TP Thomas
2 Item No. or Description of Work: Plumbing
3 Dollar Amount or Percentage of Total Bid .053
4 Business Address: Dinuba CA
5 Class C36 License No. 613719 DIR Registration No. 1000007407
6 **SUBCONTRACTOR:** Lawson Mechanical
7 Item No. or Description of Work: HVAC / mechanical
8 Dollar Amount or Percentage of Total Bid .11
9 Business Address: Fresno, CA
10 Class C20 License No. 178385 DIR Registration No. 1000002024
11 **SUBCONTRACTOR:** Contra Costa Electric
12 Item No. or Description of Work: Electrical
13 Dollar Amount or Percentage of Total Bid .07
14 Business Address: Fresno CA
15 Class C10 License No. 139885 DIR Registration No. 1000001625
16 **SUBCONTRACTOR:** Dave Christian
17 Item No. or Description of Work: earthwork
18 Dollar Amount or Percentage of Total Bid .03
19 Business Address: Fresno CA
20 Class C12 License No. 377698 DIR Registration No. 1000002062
21 **SUBCONTRACTOR:** Mavrin Construction
22 Item No. or Description of Work: Concrete
23 Dollar Amount or Percentage of Total Bid .071
24 Business Address: Fresno CA
25 Class C8 License No. 903787 DIR Registration No. 1000009412
26 **SUBCONTRACTOR:** Landscape Development
27 Item No. or Description of Work: Landscape
28 Dollar Amount or Percentage of Total Bid .025
29 Business Address: Bakersfield CA
30 Class C27 License No. 450067 DIR Registration No. 1000024024
31

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTOR: JP Thomas
Item No. or Description of Work: Site Utilities
Dollar Amount or Percentage of Total Bid .053
Business Address: Dinuba CA
Class C36 License No. 613719 DIR Registration No. 1000007407

SUBCONTRACTOR: Quality Carpets
Item No. or Description of Work: Flooring/carpet
Dollar Amount or Percentage of Total Bid .006
Business Address: Clovis CA
Class C15 License No. 989918 DIR Registration No. 1000023070

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No._____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No._____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No._____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____DIR Registration No._____

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

To the Board of Supervisors, County of Fresno:

NONCOLLUSION AFFIDAVIT

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID *

KURT E. ZUMWALT
(Printed or Typed Name)

being first duly sworn, deposes and says that he or she is

PRESIDENT
(Owner, Partner, Corporate Officer (list title), Co-Venturer)

of ZUMWALT CONSTRUCTION, INC
(Bidding Entity)

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

(Signature) 11/17/16 (Dated)

(Title 23 United States Code Section 112)

(Calif Public Contract Code Section 7106; Stats.1988, c. 1548, Section 1.)

* NOTE: Completing, signing, and returning the Noncollusion Affidavit is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Proposal - 4.2

PROJECT: CRISIS RESIDENTIAL TREATMENT FACILITY (CRT)

CONTRACT NO: 16-S-05

(This guaranty shall be executed by the successful bidder in accordance with Article 2.32 of the General Conditions. The bidder may execute the guaranty on this page at the time of submitting his bid.)

GUARANTY

To the Owner: County of Fresno

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after the date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with his obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

ZUMWALT CONSTRUCTION, INC
(Company)

By: _____

PRESIDENT
(Title)

Date: 11/17/16

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AGREEMENT

THIS AGREEMENT made the 24th day of February, 2017, at Fresno, in Fresno County, California, by and between Zumwalt Construction, Inc. hereinafter called the Contractor, and the County of Fresno hereinafter called the Owner.

WITNESSETH: That the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

ARTICLE I. The Contractor agrees to furnish all labor and materials, including tools, implements, and appliances required, and to perform all the work in a good and workmanlike manner, free from any and all liens and claims of mechanics, materialmen, subcontractors, artisans, machinists, teamsters, draymen and laborers required for:

Crisis Residential Treatment Facility
Contract No. 16-S-05

Located at 496 South Barton Avenue, Fresno, California, all in strict compliance with the plans, drawings and specifications therefore prepared by the Director of the Fresno County Department of Public Works and Planning and his authorized representatives, hereinafter called the Engineer, and other contract documents relating thereto.

ARTICLE II. The Contractor and the Owner agree that the Advertisement (Notice to Contractors), the Wage Scale, the Proposal hereto attached, the Instructions to Bidders, the General Conditions and Supplemental General Conditions of the contract, the Specifications, the Drawings and the Addenda and Bulletins thereto, the Contract Bonds and Certificates of Liability and Workers Compensation Insurance, and the Contract Change Orders, together with this Agreement, form the Contract Documents, and they are as fully a part of the contract as if hereto attached or herein repeated. The specifications and drawings are intended to cooperate so that any work exhibited in the drawings and not mentioned in the specifications, or vice versa, is to be executed the same as if both are mentioned in the specifications and set forth in the drawings, to the true intent and meaning of the said drawings and specifications when taken together. But no part of said specifications that is in conflict with any portion of this Agreement, or that is not actually descriptive of the work to be done thereunder, or of the manner in which the said work is to be executed, shall be considered as any part of this Agreement, but shall be utterly null and void, and anything that is expressly stated, delineated or shown in or upon the specifications or drawings shall govern and be followed, notwithstanding anything to the contrary in any other source of information or authority to which reference may be made.

ARTICLE III. The Contractor agrees that the work under the contract shall be completed as determined by the Owner within **Two Hundred and Fifty Six (256) CALENDAR DAYS** from the date shown in the Notice to Proceed. Time of performance shall be deemed as of the essence hereof and it is agreed that actual damages to the owner from any delay in completion beyond the date provided for herein, or any extension thereof until the work is completed or accepted, shall be all provable damages plus liquidated damages in the amount of **Three Thousand, Five Hundred and 00/100 DOLLARS ($3,500)** per day; that said liquidated damage was

arrived at by a studied estimate of loss to the Owner in the event of a delay considering the following damage items which are extremely difficult or impossible to determine: Additional construction expense resulting from delay of completion including, but not limited to, engineering, inspection, rental and utilities; provided, however, the Owner may conditionally accept the work and occupy and use the same if there has been such a degree of completion as shall in its opinion render the same safe, fit and convenient for the use for which it is intended and in such cases the Contractor and Surety shall not be charged for liquidated damages for any period subsequent to such conditional acceptance and occupation by the Owner but Owner may assess actual damages caused by failure of total completion during such period. The time during which the Contractor is delayed in said work by the acts or neglects of the Owner or its employees or those under it by contract or otherwise, or by the acts of God which the Contractor could not have reasonably foreseen and provided for, or by storms and inclement weather which delays the work, or by any strikes, boycotts, or like obstructive action by employee or labor organizations, or by any general lockouts or other defensive action by employers, whether general, or by organizations of employers, shall be added to the time for completion as aforesaid.

ARTICLE IV. The Owner agrees to pay the Contractor in current funds for the performance of the contract **FOUR MILLION FIVE HUNDRED SIXTY-EIGHT THOUSAND TWO HUNDRED TWENTY-NINE DOLLARS AND 00/100 ($4,568,229.00) DOLLARS**, which sum is computed as follows:

TOTAL OF BASE BID AND ADDITIVE BIDS

and to make payments on account thereof as provided in the General Conditions.

ARTICLE V. The Contractor and the Owner agree that changes in this Agreement or in the work to be done under this Agreement shall become effective only when written in the form of a supplemental agreement or change order and approved and signed by the Owner and the Contractor. It is specifically agreed that the Owner shall have the right to request any alterations, deviations, reductions or additions to the contract or the plans or specifications or any of them, and the amount of the cost thereof shall be added to or deducted from the amount of the contract price aforesaid by fair and reasonable valuations thereof.

And this contract shall be held to be completed when the work is finished in accordance with the original plans and specifications as amended by such changes. No such change or modification shall release or exonerate any surety upon any guaranty or bond given in connection with this contract.

ARTICLE VI. In the event of a dispute between the Owner or Engineer and the Contractor as to an interpretation of any of the specifications or as to the quality of sufficiency of material or workmanship, the decision of the Engineer shall for the time being prevail and the Contractor, without delaying the job, shall proceed as directed by the Engineer without prejudice to a final determination by negotiation, arbitration by mutual consent or litigation and should the Contractor be finally determined to be either wholly or partially correct, the Owner shall reimburse him for any added costs he may have incurred by reason of work done or material supplied beyond the terms of the contract as a result of complying with the Engineer's directions as aforesaid. In the event the Contractor shall neglect to prosecute the work properly or fail to perform any

provisions of this contract, the Owner, after three days' written notice to the Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due to the Contractor, subject to final settlement between the parties as in this paragraph hereinabove provided.

ARTICLE VII. If the Contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he or any of his subcontractors should persistently violate any of the provisions of the contract, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper material, or if he should fail to make prompt payment to subcontractors or for material or labor or persistently disregard laws, ordinances or the instructions of the Engineer, then the Owner may, upon the certificate of the Engineer, when sufficient cause exists to justify such action, serve written notice upon the Contractor and his surety of its intention to terminate the contract, such notice to contain the reasons for such intention to terminate the contract, and unless within five days after the serving of such notice, such violations shall cease and satisfactory arrangements for correction thereof be made, the contract shall, upon the expiration of said five days, cease and terminate.

In the event of any such termination, the Owner shall immediately serve written notice thereof upon the surety and the Contractor, and the surety shall have the right to take over and perform the contract, provided, however, that if the surety within ten (10) days after the serving upon it of notice of termination does not give the Owner written notice of its intention to take over and perform the contract or does not commence performance thereof within the ten (10) days stated above from the date of the serving of such notice, the Owner may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable for the account and at the expense of the Contractor, and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may without liability for so doing, take possession of and utilize in completing the work, such materials, appliances, plant and other property belonging to the Contractor as may be on the site or the work and necessary therefore. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

If the unpaid balance of the contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and damage incurred through the Contractor's default, shall be certified by the Engineer.

ARTICLE VIII. The Contractor and his subcontractors shall comply with Sections 1770 – 1780 of the California Labor Code and the provisions of Sections 2.52 and 2.55 of the General Conditions concerning the payment of wages to all workers and mechanics, and the employment and payment of apprentices by the Contractor or any subcontractor for all work performed on the Project.

ARTICLE IX. The Contractor and his subcontractors shall comply with Sections 1810 to 1815 of the California Labor Code and the provisions of Section 2.51 of the General

Conditions, concerning hours of work and payment of overtime compensation for all work performed on the Project.

The Board of Supervisors hereby specifies that portions of the work can only be performed outside the regular working hours as defined in the applicable collective bargaining agreement filed with the Director of Industrial Relations in accordance with Labor Code Section 1773.1, and that the overtime requirements for Saturdays, and holidays are hereby waived for these portions of the work, as more particularly described in the specifications. However, this exemption shall not negate the overtime provisions specified in Labor Code Section 1815.

ARTICLE X. To the fullest extent permitted by law, Contractor agrees to and shall indemnify, save, hold harmless and at County's request, defend County and its officers, agents and employees, and the Engineer and Construction Manager and their respective officers, agents and employees, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to County, the Engineer or Construction Manager in connection with the performance, or failure to perform, by Contractor, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of Contractor, its officers, agents or employees under this Agreement. In addition, Contractor agrees to indemnify County for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of Contractor.

In any and all claims against the County, the Engineer or Construction Manager, or any of their respective officers, agents or employees, initiated by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation set forth in the immediately preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE XI. Without limiting the Owner's right to obtain indemnification from Contractor or any third parties, Contractor, at its sole expense, in accordance with the provisions of Section 2.40 of the General Conditions, shall maintain in full force and effect the following insurance policies throughout the term of this Agreement, excepting only those policies for which a longer term is specified:

A. Course of Construction (Builder's All Risk) Insurance, with scope and amount of coverage as specified in Section 2.40 E.1 of the General Conditions.

B. Commercial General Liability Insurance, with scope and amount of coverage as specified in Section 2.40 E.2 of the General Conditions.

C. Automobile Liability Insurance, with scope and amount of coverage as specified in Section 2.40 E.2 of the General Conditions.

D. Professional Liability Insurance, with scope and amount of coverage as specified in Section 2.40 E.3 of the General Conditions.

E. Worker's Compensation Insurance, with scope and amount of coverage as specified in Section 2.40 E. 4 of the General Conditions.

The Certificate of Insurance shall be issued in triplicate, to the COUNTY OF FRESNO, and all other participating agencies, whether or not said agencies are named herein, who contribute to the cost of the work or have jurisdiction over areas in which the work is to be performed and all officers and employees of said agencies while acting within the course and scope of their duties and responsibilities.

ARTICLE XII. MISCELLANEOUS PROVISIONS:

1. **AUDITS AND INSPECTIONS:** The CONTRACTOR shall at any time during business hours, and as often as the OWNER may deem necessary, make available to the OWNER for examination all of its records and data with respect to the matters covered by this Agreement. The CONTRACTOR shall, upon request by the OWNER, permit the OWNER to audit and inspect all of such records and data necessary to ensure CONTRACTOR'S compliance with the terms of this Agreement. If this Agreement exceeds ten thousand dollars ($10,000.00), CONTRACTOR shall be subject to the examination and audit of the Auditor General for a period of three (3) years after final payment under contract (Government Code Section 8546.7).

2. **INDEPENDENT CONTRACTOR**. In performance of the work, duties, and obligations assumed by CONTRACTOR under this Agreement, it is mutually understood and agreed that CONTRACTOR, including any and all of CONTRACTOR officers, agents, and employees will at all times be acting and performing as an independent contractor, and shall act in an independent capacity and not as an officer, agent, servant, employee, joint venture, partner, or associate of the OWNER. CONTRACTOR and OWNER shall comply with all applicable provisions of law and the rules and regulations, if any, of governmental authorities having jurisdiction over matters of the subject thereof. Because of its status as an independent contractor, CONTRACTOR shall have absolutely no right to employment rights and benefits available to OWNER's employees. CONTRACTOR shall be solely liable and responsible for providing to, or on behalf of, its employees all legally-required employee benefits. In addition, CONTRACTOR shall be solely responsible and save OWNER harmless from all matters related to payment of CONTRACTOR's employees, including compliance with social security, withholding, and all other regulations governing such matters. It is acknowledged that during the term of this Agreement, CONTRACTOR may be providing services to others unrelated to the OWNER or to this Agreement.

3. **DISCLOSURE OF SELF-DEALING TRANSACTIONS** This provision is only applicable if the CONTRACTOR is operating as a corporation (a for-profit or non-profit corporation) or if during the term of the agreement, the CONTRACTOR changes its status to operate as a corporation. Members of the CONTRACTOR's Board of Directors shall disclose any self-dealing transactions that they are a party to while CONTRACTOR is providing goods or performing services under this agreement. A self-dealing transaction shall mean a transaction to which the CONTRACTOR is a party and in which one or more of its directors has a material financial interest. Members of the Board of Directors shall disclose any self-dealing transactions that they are a party to by completing and signing a Self-Dealing Transaction Disclosure Form, attached hereto as Exhibit A and incorporated herein by reference, and submitting it to the OWNER prior to commencing with the self-dealing transaction or immediately thereafter.

ARTICLE XII. The Contractor represents that he has secured the payment of Workers Compensation in compliance with the provisions of the Labor Code of the State of

California and Paragraphs B.3, C.3 and E.4 of Section 2.40 of the General Conditions, and that he will continue so to comply with such statutory and contractual provisions for the duration and entirety of the performance of the work contemplated herein.

This Contract, 16-S-05, was awarded by the Board of Supervisors on January 10, 2017. It has been reviewed by the Department of Public Works and Planning and is in proper order for signature by the Chairman of the Board of Supervisors.

Director, Department of Public Works and Planning

COUNTY OF FRESNO
(Owner)

By: _____

Chairman, Board Of Supervisors

ATTEST:
BERNICE E. SEIDEL, Clerk
Board of Supervisors
By _____ Deputy

Zumwalt Construction, Inc.
(Contractor)

77-0391018
Taxpayer Federal I.D. No.

By: _____
Kurt E. Zumwalt

Title: President

SELF-DEALING TRANSACTION DISCLOSURE FORM

(1) Company Board Member Information:

Name: _____ Date: _____

Job Title: _____

(2) Company/Agency Name and Address:

_____

_____

_____

_____

(3) Disclosure (Please describe the nature of the self-dealing transaction you are a party to)

_____

_____

_____

_____

(4) Explain why this self-dealing transaction is consistent with the requirements of Corporations Code 5233 (a)

_____

_____

_____

_____

_____

_____

_____

(5) Authorized Signature

Signature: _____ Date: _____

SELF-DEALING TRANSACTION DISCLOSURE FORM INSTRUCTIONS

In order to conduct business with the County of Fresno (hereinafter referred to as "County"), members of a contractor's board of directors (hereinafter referred to as "County Contractor"), must disclose any self-dealing transactions that they are a party to while providing goods, performing services, or both for the County. A self-dealing transaction is defined below:

"A self-dealing transaction means a transaction to which the corporation is a party and which one or more of its directors has a material financial interest"

The definition above will be utilized for purposes of completing the disclosure form.

(1) Enter board member's name, job title (if applicable), and date this disclosure is being made.

(2) Enter the board member's company/agency name and address.

(3) Describe in detail the nature of the self-dealing transaction that is being disclosed to the County. At a minimum, include a description of the following:

   a. The name of the agency/company with which the corporation has the transaction; and

   b. The nature of the material financial interest in the Corporation's transaction that the board member has.

(4) Describe in detail why the self-dealing transaction is appropriate based on applicable provisions of the Corporations Codes.

(5) Form must be signed by the board member that is involved in the self-dealing transaction described in Sections (3) and (4).

CONTRACTOR REQUEST FOR CLARIFICATION
PROJECT: CRISIS RESIDENTIAL TREATMENT FACILITY (CRT)
Contract No.: 16-S-05

Requests for clarification of the plans and specifications regarding this project shall be submitted on this form. Any change or clarification of the project plans and specifications shall be in the form of a written addendum issued to planholders of record. Contractors requesting clarification shall complete the following:

Fax form to (559) 600-4399 or e-mail to DesignServices@co.fresno.ca.us

FIRM NAME: _____

SENDER / CONTACT NAME: _____

MAILING ADDRESS: _____
Zip Code

BUSINESS PHONE: (_____)_____ FAX NUMBER: (____)_____

Drawing No.:	Spec Section:

Question Type or print one question below

Response

The following section is for County use only.

Response By:_____ Date:_____

Included in Addendum No._____ Date:_____

Date Received:_____ Time Received:_____ am / pm RFC Number:_____

This form may be removed from the project specifications and/or reproduced as needed.

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PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

To the Board of Supervisors, County of Fresno:

NONCOLLUSION AFFIDAVIT

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID *

KURT E. ZUMWALT
(Printed or Typed Name)

being first duly sworn, deposes and says that he or she is

PRESIDENT
(Owner, Partner, Corporate Officer (list title), Co-Venturer)

of ZUMWALT CONSTRUCTION, INC
(Bidding Entity)

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

(Signature) (Dated) 11/17/16

(Title 23 United States Code Section 112)

(Calif Public Contract Code Section 7106; Stats.1988, c. 1548, Section 1.)

* NOTE: Completing, signing, and returning the Noncollusion Affidavit is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Proposal - 4.2

PROJECT: CRISIS RESIDENTIAL TREATMENT FACILITY (CRT)

CONTRACT NO: 16-S-05

(This guaranty shall be executed by the successful bidder in accordance with Article 2.32 of the General Conditions. The bidder may execute the guaranty on this page at the time of submitting his bid.)

GUARANTY

To the Owner: County of Fresno

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after the date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with his obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

ZUMWALT CONSTRUCTION, INC
(Company)

By: _____

PRESIDENT
(Title)

Date: 11/17/16

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GENERAL CONDITIONS

2.01 IDENTIFICATION OF CONTRACT

A. The Agreement shall be signed by the Contractor and the Owner.

B. The Contract Documents are defined in ARTICLE II of the Agreement.

C. The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined above. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect or Engineer and the Contractor, but the Architect or Engineer shall be entitled to performance of the obligations of the Contractor intended for their benefit and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any Subcontractor or Sub-subcontractor.

2.02 EXECUTION, CORRELATION, AND INTENT OF CONTRACT DOCUMENTS

A. The Contract Documents are complementary and anything called for by one shall be supplied as if called for by all, providing it comes clearly within the scope of the Contract.

B. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations that have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

C. Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with the local conditions under which the Work is to be performed, and has correlated personal observations with the requirements of the Contract Documents.

D. All work and material shall be the best of the respective kinds specified or indicated. Should any workmanship or materials be required that are not directly or indirectly called for in the Contract Documents, but which nevertheless are necessary for proper fulfillment of the obvious intent thereof, said workmanship or materials shall be the same for similar parts that are detailed, indicated or specified, and the Contractor shall understand the same to be implied and provide for it in his/her tender as if it were particularly described or delineated.

2.03 OWNERSHIP AND USE OF DOCUMENTS

All Contract Documents and copies thereof furnished shall remain the property of the Owner. With the exception of one (1) contract set for each party to the Contract, such

documents are to be returned by Contractor or suitably accounted for to the Owner on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's common law copyright or other reserved rights. The Owner's use of the documents will not increase the Architect's design liability beyond the Project and the site for which the design was originally intended.

2.04 DEFINITIONS

The following words, or variations thereof, as used in these documents have meanings as defined:

A. The Work - The Work comprises the completed construction required of the Contractor by the Contract Documents, and includes all labor, materials, equipment and services necessary to produce such construction, and all materials, other permits and equipment incorporated or to be incorporated in such construction.

B. The Project –
The work to be done consists of generally of the construction of the Crisis Residential Treatment Facility, parking and associated site improvements for Fresno County. This project consists of a wood-framed, single-story building of approximately 11,700 square feet on a site of approximately 1.2 acres. This project site is located on the Kings Canyon Campus at 496 South Barton Ave., Fresno, CA 93702

Work includes, but is not limited to: General Conditions, temporary facilities, site preparation, demolition, on-site utilities, concrete, steel, masonry, metals, casework, thermal moisture protection, doors and windows, hardware, finishes, equipment, specialties, Mechanical, Plumbing, Electrical, fire suppression, fire alarm, CCTV surveillance, telecommunications, energy management system, extension of existing utilities,

C. Owner - The County of Fresno, in the State of California, as represented by the Fresno County Board of Supervisors and so named in the Agreement. The term Owner means the Owner or the Owner’s authorized representative for this project.

D. Construction Manager (CM) – The Capital Projects Division Manager or his/her designee, as defined in Section 2.04C, in all aspects of administering the contract on behalf of the Owner.

E. Inspector of Record (IOR) - The Capital Projects Division Manager or his/her designee to perform Quality Assurance inspection of the Work. (Also sometimes referred to as Project Inspector or Owner’s Inspector or Owner’s Project Inspector.)

F. Architect or Engineer – The Owner and his/her authorized representatives, as defined in Section 2.04C, or a duly licensed Architect and/or Engineer providing consultant services in accordance with an agreement with the Owner.

G. Contractor - When used in the General Conditions refers to person(s) or entity (partnership or corporation) so named in Agreement and when used in the body

of the Specifications, refers to the Contractor for that specific work, whether it be the General Contractor, Subcontractor, or other Contractor. The term Contractor means the Contractor or the Contractor's authorized representative.

H. Subcontractor - Person, persons, entity, co-partnership or corporation having direct contract with Contractor to perform any of the Work at the site. The term Subcontractor means a Subcontractor or a Subcontractor's authorized representative. The term Subcontractor does not include any separate contractor or any separate contractor's subcontractors.

I. Sub-subcontractor – Person, persons, entity, co-partnership or corporation having a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-subcontractor means a Sub-subcontractor or an authorized representative thereof.

2.05 SPECIFICATIONS AND DRAWINGS

A. Precedence – Anything mentioned in the Specifications and not shown on the Drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. Subject to Article 2.02, in cases of discrepancy concerning dimension, quantity and location, the Drawings shall take precedence over the Specifications. Explanatory notes on the Drawings shall take precedence over conflicting drawn indications. Large scale details shall take precedence over smaller scale details and figured dimensions shall take precedence over scaled measurement. Where figures are not shown, scale measurements shall be followed but shall in all cases be verified by measuring actual conditions of Work already in place. In cases of discrepancy concerning quality and application of materials and non-technical requirements over materials, the specifications shall take precedence over Drawings.

B. Division of Specifications - For convenience of reference and to facilitate the letting of independent contracts, this specification may be separated into certain sections; such separation shall not operate to oblige the Owner, Architect or Engineer or Professional Consultant to establish the limits of any contract between the Contractor and Sub-Contractor each of whom shall depend upon his/her own contract stipulations. The General Conditions apply with equal force to all work, including extra work.

C. Governing Factors - Dimensions figured on drawings shall be followed in every case in preference to scale of drawings.

D. Discrepancies - Should the Contractor, at any time, discover a discrepancy in a drawing or specification, or any variation between dimensions on drawings and measurements at site, or any lacking of dimensions or other information, he/she shall report at once to the CM requesting clarification and shall not proceed with the work affected thereby until such clarification has been made. If the Contractor proceeds with work affected by such discrepancies, without having received such clarification, he/she does so at his/her own risk. Any adjustments involving such circumstances made by the Contractor, prior to approval by the IOR, shall be at the Contractor's risk and the settlement of any complications or disputes arising therefrom shall be at the Contractor's sole expense and Contractor shall indemnify, hold harmless and defend Owner, Owner's representatives, and CM from any liability or loss with respect to said adjustments.

E. Scope of Drawings - The drawings shall be held to determine the general character of the Work as well as its details. Parts not detailed shall be constructed in accordance with best standard practice for work of this class, so as to afford the requisite strength and logically complete the parts they compose. Where it is obvious that a drawing illustrates only a part of a given work or of a number of items, the remainder shall be deemed repetitious and so construed. The Contractor shall be responsible for all errors made in using any drawings which have been superseded.

F. Shop Drawings, Product Data and Samples –

1. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work. Samples are physical examples that illustrate materials, equipment or workmanship, and establish standards by which the work will be judged.

2. The Contractor will be required to submit Shop Drawings, Product Data and Samples in electronic PDF format.

3. The Contractor shall prepare, review, approve and submit to the CM, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

4. By preparing, approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so with reasonable promptness, and has checked and coordinated the information contained within such submittals with the requirements of the Work, the Project and the Contract Documents.

5. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data or Samples, unless the Contractor has specifically informed the CM in writing of such deviation at the time of submission and the Architect has reviewed the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's review of them.

6. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications. The cost of such certifications shall be borne by the Contractor. Owner may elect to have an independent certification performed at its own expense. The Owner shall have final approving authority for performance-based items.

7. The Contractor shall direct specific attention, in writing or on resubmitted Shop drawings, Product Data, or Samples, to revisions other than those requested by the Architect on previous submittals.

8. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been reviewed by the Architect. All such portions of the Work shall be in accordance with reviewed submittals.

9. Submission of Shop Drawings and Samples to the CM is required for only those items specifically mentioned in the Specification Sections. If Contractor submits Shop Drawings for items other than the above, the CM will not be obligated to distribute or review them. Contractor shall be responsible for the procuring of Shop Drawings for his/her own use as he/she may require for the progress of the Work.

10. The term "Shop Drawings" as used herein also includes but is not limited to fabrication, erection, layout and setting drawings, manufacturer's standard drawings, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment or systems and the positions and layout of each conform to the Contract requirements. As used herein the term "manufactured" applies to standard units usually mass-produced, and the term "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall establish the actual detail of all manufactured or fabricated items; indicate proper relation to adjoining work; amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure; and incorporate minor changes of design or construction to suit actual conditions.

11. Drawings: Following Contractor's review and approval, Contractor shall be required to submit electronic files to the CM for approval. The CM will check the submittal to see if it is complete. If complete, the CM will forward the drawings to the Owner and the Architect. The Architect and Owner will check the drawings and note Architect and Owner comments and affix a stamp to the drawings indicating the status of acceptance, and will process the Drawings back to all parties. The Architect or his/her consultants, as applicable, will review the Shop Drawings; mark the documents with required revisions; stamp the documents and indicate “Reviewed”, “Reviewed – Additional Information Required”,”Furnish as Corrected”, “Revise and Resubmit”, , or “Rejected”., and return the documents. The CM will return the documents to the Contractor. The Contractor shall then print and distribute the appropriate number of copies to his/her job personnel as required. If a drawing is stamped “Rejected” or “Revise and Resubmit”, the Contractor shall correct and resubmit as outlined above. When stamped “Make Corrections Noted”, or similar instructions, the Contractor shall correct and resubmit electronic files for record only. Also see Technical Specifications, Division 1, General Requirements, Section 01 33 23 - Submittal Procedures.

12. Samples: Following Contractor's review and approval, he/she shall submit to the Architect or Engineer, four (4) samples of all materials in quantities and sizes as specified herein. Submittals shall be given to the Architect or Engineer at a time determined by the Contractor, which allows for any necessary resubmittal and which will not cause any delay in the Work. Samples will be forwarded to the Architect. If a sample is stamped “Rejected” or “Revise and Resubmit”, one sample so noted will be returned to the Contractor. The Contractor shall correct and resubmit as outlined above. If a sample is stamped "Make Corrections Noted", one sample so noted will be returned. Corrected samples shall be resubmitted for approval as per the original submittal. Also see General Requirements Section 01 33 23.

13. Product Data: Following Contractor's review and approval, he/she shall submit to the Architect or Engineer six (6) copies of all manufacturer's catalogs or brochures as required. Brochures will be forwarded to the Architect for review. If a brochure is stamped “Reviewed”, “Furnish as Corrected” two (2) copies will be returned to the Contractor. If stamped "Rejected", one marked copy and two (2) unmarked copies will be returned. Corrected copies shall be resubmitted for approval as per the original submittal. Also see General Requirements Section 01 33 23.

14. Manufacturer's Instructions: Where any item or work is required by Specifications to be furnished, installed or performed in accordance with a specified product manufacturer's instructions, Contractor shall procure and distribute the necessary copies of such instructions to all concerned parties.

G. Materials - All materials, unless otherwise specified, shall be new and of good quality, proof of which shall be furnished by the Contractor; in case of doubt as to kind or quality required, samples shall be submitted to the Architect/Engineer through the Architect or Engineer who will specify the kind and use of the material appropriate to the location and the function of the item in question and Contractor shall furnish such accordingly. Before final payment, all material rejected by the Architect or Engineer or Architect shall be promptly removed from the premises by the Contractor, whether or not completely installed, and promptly and properly replaced with correct materials, including any other work adjoining if disturbed, in accordance with the contract and without expense to the Owner; the Contractor also shall pay for work of other Contractors as is affected by such removals and replacements.

2.06 THE ARCHITECT

A. The Architect advises the CM in all aspects of the construction phase of the Project. His/Her functions include advice and assistance to the CM in the correct interpretation and application of the Contract Documents. The Architect is not authorized independently to issue Addenda, Clarifications, Field Orders, Work Authorizations, or Change Orders, or in any other way to bind the Owner in discussions with the Contractor.

B. The Contractor shall deliver all correspondence relating to the proper execution of the Work to the CM. The CM reserves the right to consult with the Architect and Owner prior to responding to the Contractor's correspondence.

C. When discussions between the Contractor and the CM occur either on the site or elsewhere, but the Architect is not present, the CM reserves the right to consult with the Architect and Owner prior to issuing his/her final decision or instruction.

D. The Architect shall review or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and the information given in the Contract Documents. Such action shall generally be taken within ten (10) working days, however under certain circumstances such as very complex submittals or if a large number of submittals are submitted at one (1) time it may take longer. In this case the Contractor will be notified and given the opportunity to advise the Engineer and Architect of priorities. The Architect's review of a specific item shall not indicate review of an assembly of which the item is a component.

2.07 CONSTRUCTION MANAGER

A. The CM is the authorized representative of the Owner in all aspects of administering the construction contract on behalf of the Owner. All communications from and to the Contractor will be channeled through the CM. However, the CM does not have the authority to bind the Owner in matters affecting adjustments to the time or cost of the project as defined in the Agreement for Construction.

B. The CM will be the Owner's representative during the construction and until final payment to all contractors is due. The CM will advise and consult with the Owner. All instructions to the Contractor shall be forwarded through the CM. The CM will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument. The County’s General Services Department will be the Owner’s representative during the warranty periods.

C. The CM will be on site during construction to monitor the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of on-site observations and communication with the Contractor, the CM will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

D. The CM shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so that the CM may perform its functions under the Contract Documents.

E. Based on the CM's observations, and an evaluation of the Contractor's Application for Payment, the CM will determine the amount owing to the Contractor and will issue to the Owner Certificates for Payment incorporating such amount.

F. The CM will be the initial interpreter of the requirements of the Contract Documents and the initial judge of the performance hereunder by the Contractor. The Owner will have final authority of all such matters.

G. The CM will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with agreed upon time limits. Either party to the Contract may make written request to the CM for such interpretations.

H. Claims, disputes and other matters in question between the Contractor and the CM relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred to the Owner (or his/her designee).

I. All interpretations and decisions of the CM will be in writing or in graphic form, and shall be both consistent with the intent of the Contract Documents and reasonably inferable therefrom.

J. The CM will have the authority to reject, or recommend to the Owner the rejection, of any work that does not conform to the Contract Documents. Whenever, in the CM's opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the CM will have authority to require special inspection or testing of the Work whether or not such work be then fabricated, installed or completed.

K. The CM will receive from the Contractor and review all Shop Drawings, Product Data and Samples, and forward same to Architect and Owner for review.

L. Following consultation with the Owner, the CM will take appropriate action on Change Orders, and will have authority to order minor changes in the Work as provided herein.

M. The CM will conduct inspections to determine the date of Completion, and will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract Documents and assembled by the Contractor. The CM will issue a final Project Certificate for Payment upon compliance with the requirements for completion and final payment. The County Department of General Services will monitor the warranty for a period of one (1) year, unless otherwise specified as a longer term.

N. The duties, responsibilities and limitations of authority of the CM as the Owner's representatives during construction as set forth in the Contract Documents, will not be modified or extended without written consent of the Owner, the Contractor and the CM, which consent shall not be unreasonably withheld. Failure of the Contractor to respond within ten (10) days to a written request shall constitute consent by the Contractor.

O. In case of the termination of the employment of the CM, the Owner may appoint a successor CM, whose status and duties under the Contract Documents shall be the same as those of the former CM.

P. The Inspector of Record (IOR) shall act as an agent for the County at the project site with respect to compliance with code, plans, specifications and quality assurance required of a public works Project. The IOR shall issue correction and stop work notices and notify the CM and County in writing if work does not conform to contract documents. The services of the IOR shall not relieve the Contractor of compliance with the Contract documents, codes and regulations.

2.08 OWNER

A. Information and Services Required of the Owner

1. Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2. Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3. The Owner shall forward all instructions to the Contractor through the CM.

B. Owner's Right to Stop the Work

If the Contractor fails to correct defective work as required by Article 2.42 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of any contractor or any other person or entity, except to the extent required by Article 2.12.C.

C. Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails after written notice from the Owner to correct such default or neglect with diligence and promptness, the Owner may, after an additional written notice and without prejudice to any other remedy the Owner may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the additional services of the Architect or other professionals made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Architect or Engineer. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner, or Owner may require payment by the surety on the performance or warranty bonds as appropriate. Such action shall, in no way, affect the status of either party under contract, nor be held as a basis of any claim by the Contractor for damages or extension of time.

2.09 CONTRACTOR RESPONSIBILITIES

A. Review of Contract Documents and Field Conditions

1. The Contractor shall carefully study and compare the Contract Documents and shall at once report to the CM any discrepancy or inconsistency that may be discovered. The Contractor shall not be liable to the Owner or the CM for any damage resulting from any such

inconsistencies or discrepancies in the Contract Documents unless the Contractor recognized such inconsistencies or discrepancies and knowingly failed to report it to the CM. The Contractor shall perform no portion of the Work at any time unless authorized by the Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

2. Neither the Owner nor the CM or Architect assume any responsibility for an understanding or representation made by any of their agents or representation prior to the execution of the Agreement unless (1) such understanding or representations are expressly stated in the Agreement, and (2) the Agreement expressly provides that responsibility therefore is assumed by the Owner.

3. Failure by the Contractor to acquaint himself/herself with all available information will not relieve him/her from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

4. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Any inconsistencies or discrepancies discovered by the Contractor shall be reported to the CM at once.

5. Before submitting any Request for Information (RFI), or other contractor initiated request for information, the Contractor shall determine that the information requested is not clearly provided in the Contract Documents. RFI's shall be submitted to the CM only from the Contractor, or Owner, and not from any subcontractor, supplier or other vendor, and shall be on a form approved by the CM. The Contractor shall provide a revised and updated RFI Priority Schedule on a weekly basis. The RFI Priority Schedule shall rank RFI's in order of priority and include a brief statement of reason for priority. Owner initiated RFI's will not be listed on the Contractor's RFI Priority Schedule. The Owner will provide the Architect or Engineer a separate list of Owner initiated RFI's upon request of the Architect or Engineer. The Architect or Engineer will endeavor to respect the order of priorities as requested by the Contractor or Owner for the overall benefit of the Project. The RFI process is for information and clarification only and may not be utilized to obtain approval for changes in Contract price or time. Also see Division 1 - General Requirements.

B. Supervision Procedures

1. The Contractor shall efficiently supervise and direct the Work, using therein the Contractor's best skill and diligence for which he/she is remunerated in the contract price. He/She shall carefully inspect the site and study and compare the Contract Documents, as ignorance of any phase of any of the features or conditions affecting the Contract will not excuse him/her from carrying out its provisions to its full intent.

2. The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding

as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed upon written request in each case. The Superintendent who begins the project shall remain on the project until the project is completed, as long as the Contractor employs that person. The Superintendent shall not be replaced without the approval of the Owner.

3. The Contractor shall be responsible to the Owner for the acts and omissions of his/her employees, subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4. The Contractor shall at all times enforce strict discipline and good order among his/her employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him/her.

5. The Contractor shall not be relieved from his/her obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Owner or the Architect or Engineer in his/her administration of the Contract, or by inspections, tests or approvals required or performed by persons other than the Contractor.

C. Construction Procedures

1. Means and Methods - The Contractor shall be solely responsible for and control of construction means, methods, techniques, sequences, coordination and procedures for all the Work of this contract. Additionally, he/she shall be responsible for safety precautions and programs in connection with the Work.

2. Laws of County and State - The Contractor must comply with all rules, regulations and ordinances of the County in which the Work is being done, and all State laws pertaining to the Work.

3. Safeguards - The Contractor shall provide, in conformity with all local codes and ordinances and as may be required, such temporary walls, fences, guard-rails, barricades, lights, danger signs, enclosures, etc., and shall maintain such safeguards until all work is completed.

4. Housekeeping - Contractor shall keep the premises free of excess accumulated debris. Clean up as required and as directed by the Architect or Engineer. At completion of work all debris shall be removed from the site. Refer to General Requirements for additional requirements.

5. Labor and Materials - Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

6. The Contractor shall deliver to the Architect or Engineer, prior to final acceptance of the Work as a whole, signed certificates from suppliers of

materials and manufactured items stating that such items conform to the Contract Documents.

7. The Contractor, immediately upon Notice to Proceed (or where shop drawings, samples, etc., are required, immediately upon receipt of review thereof) shall place orders for all materials, work fabrication, and/or equipment to be employed by him/her in that portion of the Work contracted for. The Contractor shall keep all materials, work fabrications and/or equipment specified and shall advise the Architect or Engineer promptly, in writing, of all orders placed and of such materials, work fabrications and/or equipment which may not be available in a timely manner for the purposes of the Contract.

8. Any worker whose work is unsatisfactory to the Owner or the Architect or Engineer, or are considered by the Owner or Architect or Engineer to be careless, incompetent, unskilled or otherwise unfit shall be dismissed from work under the Contract upon written request to the Contractor from the Owner or the Architect or Engineer.

2.10 SUBCONTRACTORS

A. Agreements - Agreements between the Contractor, Subcontractors, and Subcontractors of lower tier shall be subject to the approval of the Owner, but in no case does such approval relieve the Contractor of any conditions imposed by the Contract Documents. The Contractor shall only use subcontractors included in his/her sealed bid unless first approved by the Owner pursuant to statute. The Contractor shall not use any subcontractor who is ineligible to perform work on a Public Works Project pursuant to section 1777.1 or 1777.7 of the Labor Code. Notwithstanding any other provision of the Contract Documents, subcontractors may be added, deleted or substituted only in accordance with the provisions of Public Contract Code Section 4100 et seq.

B. Relation with Subcontractor – By an appropriate agreement, written where legally required for enforceability, the Contractor shall bind every Sub-Contractor and every Subcontractor agrees to be bound by the terms of the Contract Documents to carry out their provisions insofar as applicable to their work; and the Contractor further agrees to pay to each Subcontractor promptly upon issuance of Certificate of Payment, his/her or their due portion. Said agreement shall preserve and protect the rights of the Owner and the Architect or Engineer under the Contract Documents with respect to the work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor Agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, under the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with their Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of Contract Documents available to their Sub-subcontractors. Nothing contained herein shall be deemed to create

an agency relationship between the Owner and any Subcontractor or material supplier.

C. Owner's Relation - Neither the acceptance of the name of Subcontractor nor the suggestion of such name nor any other act of the Owner or Architect or Engineer nor anything contained in any Contract Document is to be construed as creating any contractual relation between the Owner (or Owner's authorized representatives) and any Subcontractor of any tier nor as creating any contractual relation between the Architect or Engineer and any Subcontractor of any tier.

D. All Subcontractors employed by the Contractor shall be appropriately licensed in conformity with the laws of the State of California.

E. Jurisdictional disputes between Subcontractors or between Contractor and Subcontractor shall not be mediated or decided by the Owner, Architect or the Architect or Engineer. The Contractor shall be responsible for the resolution of all such disputes based upon his/her contractual relationship with his/her Subcontractors.

2.11 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

A. The Owner reserves the right to perform work related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that the Owner's action results in delay, damage or additional cost attributable thereto, the Contractor shall make such claim as provided elsewhere in the Contract Documents.

B. When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

C. The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

D. Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract.

2.12 MUTUAL RESPONSIBILITY

A. The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

B. When any part of the Contractor's Work depends upon proper execution or results of the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Architect or Engineer any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or separate contractor's work as fit and proper to receive the Work, except as to defects which may subsequently become apparent in such work by others.

C. If, following the reporting of any discrepancy or defect as required herein above, the Contractor suffers damage due to disruption or delay caused by the separate contractor, without fault by the Owner, the Contractor's remedy shall be limited to seeking recovery from the separate contractor.

D. Any costs caused by defective or ill-timed work shall be borne by the Contractor responsible therefor.

E. Should the Contractor cause damage to the work or property of the Owner, or to other work or property on the site, the Contractor shall promptly remedy such damage as provided herein.

F. Should the Contractor wrongfully delay or cause damage to the work or property of any separate contractor, the Contractor shall, upon due notice, promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues the Owner on account of any delay or damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings, and if any judgment or award against the Owner (or Owner’s authorized representatives) arises therefrom, the Contractor shall pay or satisfy such judgment or award in full and shall reimburse the Owner for all costs which the Owner has incurred in connection with such matter.

2.13 OWNER'S RIGHT TO CLEAN UP

If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required in the Contract Documents, the Owner may clean up and the contractor responsible therefor shall pay Owner such portions of the cost thereof as the IOR shall determine to be just.

2.14 GOVERNING LAW

The Contract shall be governed by the law of the State of California.

2.15 INSPECTION

A. All material and workmanship (if not otherwise designated by the Contract Documents) shall be subject to inspection, examination, and test by the Owner and IOR at any and all times during manufacture and/or construction and at any

and all places where such manufacture and/or construction are carried on. The Owner and IOR shall have the right to reject defective material and workmanship or require its correction.

B. The Contractor shall furnish promptly without additional charge, all reasonable facilities, labor, and materials necessary for the safe and convenient inspection and tests that may be required by the Owner and IOR.

C. Where the Contract Documents, instructions by the Owner, laws, ordinances, or any public authority having jurisdiction requires work to be inspected, tested or approved before work proceeds, such work shall not proceed, nor shall it be concealed prior to inspection.

D. The Contractor shall give the IOR at least two (2) days advance notice of the readiness for any Contract compliance inspection by the Inspector. The Contractor shall give notice as required by all other inspecting and testing agencies of jurisdiction for Code and regular compliance inspection. In all cases, the Contractor shall schedule inspections so as not to delay the Work.

E. If the IOR determines that any work requires additional special inspection beyond that identified in the specifications, the IOR will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided above. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the IOR's additional services, testing or inspections made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

F. Should it be considered necessary or advisable by the IOR at any time either before acceptance of the entire Work or after acceptance and within the guaranty period to make an examination of work already completed, by removing or tearing out same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any material respect, due to the fault of the IOR or his/her Subcontractors, he/she shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus fifteen percent (15%), shall be allowed the Contractor and he/she shall, in addition, if completion of the work has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

G. Required certificates of inspection, testing or approval shall be secured by the Contractor and the Contractor shall promptly deliver them to the Construction Manager for review and evaluation of compliance with the appropriate specifications and standards.

H. When the work is completed the Contractor shall notify the IOR in writing that the work will be ready for final inspection and test on a definite date which shall be stated in such notice.

2.16 TAXES, PERMITS, FEES, AND INDEMNIFICATION FOR PATENT INFRINGEMENT CLAIM

A. The Contractor shall pay for and include all Federal, State and local taxes direct or indirect for the work or portions thereof provided by the Contractor which are legally enacted at the time bids are opened, whether or not yet enacted, and take out and pay all fees and charges for permits and licenses, unless otherwise specified in Supplemental General Conditions or Technical Specifications of these specifications.

B. Royalty and license fees incidental to the use of any patented material, device or process shall be paid by the Contractor and in the event of a claim of alleged infringement of patent copyright, or Trade Secret rights, the Contractor shall indemnify, save the Owner (and Owner's authorized representatives) free and harmless, and defend, at the Contractor's own expense, any and all suits that may be brought in such connection.

C. Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit, permanent utility connection fees, and right-of-way encroachment permit. The Contractor shall secure and pay for temporary construction utilities, and all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time bids are opened.

D. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

E. It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, the Contractor shall promptly notify the IOR in writing, and any necessary changes shall be accomplished by appropriate Modification.

F. If the Contractor performs any work knowing it to be contrary to any laws, ordinances, rules and regulations, without notice to the IOR, the Contractor shall assume full responsibility therefore and shall bear all costs attributable thereto.

G. Any reference in the Contract Documents to codes, standard specifications or manufacturer's instructions shall mean the latest printed edition of each in effect at the Contract date.

2.17 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Within thirty (30) calendar days after receipt of Notice to Proceed, the Contractor shall submit a Construction Schedule in CPM (Critical Path Method) form to the CM for approval. The Construction Schedule shall be sufficiently detailed to accurately depict all the work required by the Contract. CPM Construction Schedule shall reflect shop drawings; submittals due and return dates, fabrication and delivery times, cost loading, crew mix, and equipment loading data. The Contractor shall thereafter adhere to the Construction Schedule, as updated monthly, or as necessary in accordance with the Contract Documents including any scope changes, or changes in the work approved by the Owner during the course of construction. "Slack" or "float" time on the CPM

Construction Schedule is neither for the sole benefit of the Owner or Contractor.

B. Within fourteen (14) calendar days after the pre-construction conference, the Contractor shall provide a Submittal and Procurement Schedule indicating time periods for review of Shop Drawings, Data, Samples, and procurement of material and equipment required for the Work. Contractor shall allow time for submittal review in accordance with the General Requirements Section – Construction Progress Documentation. All items that require review by the CM and/or are not readily available from stock and requiring more than thirty-five (35) days lead-time shall be included in the Submittal and Procurement Schedule. Items listed in the Submittal and Procurement Schedule shall also be identified as activities on the CPM Construction Schedule. Contractor shall identify items requiring coordination with work of separate contractors. The working day to calendar date correlation shall be based upon the Contractor's proposed work week with adequate allowance for legal holidays, days lost due to abnormal weather, and any special requirements of the Project.

C. The Construction Schedule shall be prepared and maintained by the Contractor.

D. The Owner, CM, Contractor and other Contractor(s) shall jointly review the progress of the work weekly. Should this review, in the opinion of the CM, indicate that the work is behind the schedule established by currently reviewed Construction Schedule, the Contractor shall either (1) provide a plan to the IOR indicating the steps the Contractor intends to take in order to recover the time behind schedule and conform to the reviewed Construction Schedule; or (2) submit a revised Construction Schedule for completion of the work, remaining within the contract completion time, to the CM for review by the next weekly meeting. If the Contractor's recovery or revised schedule requires work to occur after normal working hours or on other than normal working days, the Contractor will be responsible for any resulting costs incurred by the Owner, including but not limited to, the costs for construction management, contract administration, inspection, testing and staffing.

E. The Contractor shall deliver copies of his/her daily job logs to the CM and Owner on a weekly basis. At a minimum, the Contractor's daily job log should include the sub-contractors working onsite, number of workers and their trade classification, description of work, visitors, temperature and weather conditions, accidents, delays, and any other important information pertaining to the project that day. The Contractor will schedule and coordinate the Work of all sub-contractors on the Project. The Contractor will keep the Sub-contractors informed of the Construction Schedule to enable the Contractor to plan and perform the Work properly.

2.18 RECORDS, DOCUMENTS AND SAMPLES AT THE SITE

A. The Contractor shall maintain all records of required Review Agencies, County or State inspections and shall promptly notify the Architect or Engineer of the results of any inspection. Copies of all such records shall be provided to the Owner.

B. The Contractor shall secure and maintain required certificates of inspection, testing or approval and shall promptly deliver them to the Architect or Engineer.

C. The Contractor shall maintain at the Project site, on a daily basis, one (1) record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and reviewed Shop Drawings, Product Data and Samples. These shall be available to the CM, IOR and the Owner and reviewed weekly, and shall be delivered to the CM for forwarding to the Owner upon completion of the Project. The Contractor shall advise the CM on a current basis of all changes in the Work made during construction. Payment may be withheld from Contractor for failure to maintain current Record Documents.

2.19 USE OF SITE

A. The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

B. The Contractor shall coordinate all of the Contractor's operations with, and secure approval from, the IOR before using any portion of the site. Also see Technical Specifications, Division 1, General Requirements.

2.20 CUTTING AND PATCHING OF WORK

A. The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

B. The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold from the Owner or any separate contractor consent to cutting or otherwise altering the Work.

C. In all cases exercise extreme care in cutting operations, and perform such operations under adequate supervision by competent mechanics skilled in the applicable trade. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage.

D. All replacing, patching and repairing of all materials and surfaces cut or damaged in the execution of the Work shall be performed by experienced mechanics of the several trades involved. All work of such nature shall be done with the applicable materials, in such a manner that all surfaces so replaced, repaired, or patched, will, upon completion of the Work, match the surrounding similar surfaces.

2.21 CLEANING UP

A. The Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by the Contractor's operations. At the completion of the Work, the Contractor shall remove all the Contractor's waste

materials and rubbish from and about the Project as well as all the Contractor's tools, construction equipment, machinery and surplus materials.

B. If the Contractor fails to clean up at the completion of the Work, the Owner may do so and the cost thereof shall be paid by the Contractor.

2.22 INDEMNIFICATION

A. To the fullest extent permitted by law, Contractor agrees to and shall indemnify, save, hold harmless and at Owner's request, defend Owner and its officers, agents and employees, and the Architect and Consultants and their respective officers, agents and employees, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to Owner, the Architect or Consultants in connection with the performance, or failure to perform, by Contractor, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of Contractor, its officers, agents or employees under this Agreement. In addition, Contractor agrees to indemnify Owner for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of Contractor.

B. In any and all claims against the Owner, the Architect or Consultants, or any of their respective officers, agents or employees, initiated by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation set forth in the immediately preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

2.23 FAIR EMPLOYMENT PRACTICES CLAUSE

Nondiscrimination: In connection with the performance of Work under the contract, the Contractor agrees (as prescribed in Chapter 6 of Division 3 of Title II of the Government Code of the State of California, commencing at Section 12900 and by Labor Code Section 1735) not to discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status or sex. The aforesaid provisions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, Notices to be provided by the County, setting forth the provisions of this discrimination clause. The Contractor further agrees to insert the foregoing provisions in all subcontracts hereunder, except subcontracts for standard commercial supplies of raw materials.

2.24 PAYMENT

A. CONTRACT SUM

The Contract Sum is stated in the Owner-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

B. SCHEDULE OF VALUES

Before the first Application for Payment, the Contractor shall submit to the CM a Schedule of Values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect or Engineer may require. This schedule, unless objected to by the CM, shall be used only as a basis for the Contractor's Applications for Payment. The Contractor will be required to provide a “separate” Schedule of Values” for each of the base bid items referenced on the bid form “Section 00 42 13”

C. APPLICATIONS FOR PAYMENT

The Owner will make progress payments to the Contractor upon completion of portions of the Work, as covered by the Contract Documents, in accordance with established Owner procedures:

1. On or about the twentieth (20th) of the month in which the work was performed, the Contractor shall submit to the CM an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Owner or the CM may require, including appropriate updates to the Construction Schedule, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. Payment is expressly conditioned upon submission by the Contractor of conditional and unconditional waivers and release of lien rights upon progress payment as the Owner or the Architect or Engineer may require. Waiver and Release forms must be submitted on forms approved by the Owner. Copies of said forms shall comply with Civil Code § 3262.

2. Unless otherwise provided in the Contract Documents, payments may be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

3. The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, stop notices, claims, security interest or encumbrances, hereinafter referred to as "liens"; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by

any other person performing work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

4. On or about the twentieth (20^{th}) day of the month following the month in which the work was performed, the Owner shall pay to the Contractor ninety-five percent (95%) of the value of said work in place, as checked and approved by the CM. The balance of five percent (5%) of the estimate shall be retained by the Owner until the time of final acceptance of said work. In lieu of the five percent (5%) retainage, the Contractor may substitute securities as provided herein below.

   a. If the Owner does not pay the Contractor within thirty (30) days after receipt of an undisputed and properly submitted payment request for a progress payment, excluding that portion of the final payment designated by the contract as retention earnings, then the Owner shall pay interest to the Contractor as provided by Public Contract Code § 20104.50. Said interest penalty is the sole recourse of Contractor and Contractor shall have no right to stop the Work until payment of the amount owing has been received, nor shall the Contract Time be extended, nor shall the Contract Sum be increased in any way, including by reason of any costs incurred by Contractor, except to the extent of said interest payment.

   b. Pursuant to Public Contract Code § 7107, in the event of a dispute between the Owner and Contractor, the Owner may withhold from the final payment an amount not to exceed one hundred and fifty percent (150%) of the disputed amount. Except as so provided, the Owner shall release the retention withheld within sixty (60) days after the date of completion of the work of improvement, as "completion" is defined in Public Contract Code § 7107. In the event that retention payments are not made within the time periods required by Public Contract Code § 7107, the Owner may be subject to the interest provisions of Public Contract Code § 7107.

5. Security Substitutions and Escrow for Moneys Withheld to Insure Contractor's Performance. Pursuant to Public Contract Code section 22300, the Contractor may deposit in an escrow, equivalent securities for any moneys withheld to insure performance and have said moneys paid directly to Contractor, or, in the alternative, have the Owner deposit such moneys directly into an escrow. Upon the closing of any such escrow, Contractor shall pay to each Subcontractor, not later than twenty (20) days after receipt of the closing payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to insure the performance of the Contractor. Any escrow established pursuant to this article shall be with a state or federally chartered bank, shall be at the sole expense of the Contractor, and shall be established using an escrow agreement in substantially the following form:

(Begin Escrow Agreement)

ESCROW AGREEMENT FOR
SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between the County of Fresno, (hereinafter called "Owner"), _____ (hereinafter called "Contractor"); and _____, a state or federally chartered bank in California, (hereinafter called "Escrow Agent").

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ in the amount of $_____, and dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the contractor, the owner shall make payments of the retention earnings directly to the escrow agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of the deposit. The market value of the securities at the time of the substitution, as valued by the Owner, shall be at least equal to the cumulative total cash amount then required to be withheld as retention under the terms of the contract between Owner and Contractor. If the Owner determines that the securities are not adequate it will notify Contractor and Escrow Agent, and Contractor shall deposit additional security as further determined by the Owner. Securities shall be held in the name of the Owner and shall designate the Contractor as the beneficial owner.

2. Securities eligible for investment under subdivision (c) of the above-referenced Section 22300 shall include those listed in Section 16430 of the Government Code, and shall also include bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, and standby letters of credit. Deposit of any other type of security may be permitted only by mutual agreement of the Contractor and the Owner, evidenced by an amendment to this agreement executed by all of the parties hereto.

3. Upon the deposit of adequate securities, Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions.

4. When the Owner, at Contractor's written request, makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

5. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. The Owner, Contractor and Escrow Agent shall determine these expenses and payment terms.

6. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

7. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

8. The Owner shall have the right to draw upon the securities or any amount paid directly to Escrow Agent in the event of default by the Contractor. Upon seven (7) days written notice to the Escrow Agent from the Owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash, including any amounts paid directly to Escrow Agent, as instructed by the Owner. Escrow Agent shall not be concerned with the validity of any notice of default given by Owner pursuant to this paragraph, and shall promptly comply with Owner's instructions to pay over said escrowed assets. Escrow Agent further agrees not to interplead the escrowed assets in response to conflicting demands and hereby waives any present or future right of interpleader.

9. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

10. Escrow Agent shall rely on the written notifications from the Owner and Contractor pursuant to Sections (3), (5), (6), (7) and (8) of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

11. Securities eligible for investment under this Agreement, as provided by Public Contract Code § 22300, shall be those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and Owner.

12. The venue of any litigation concerning the rights and obligations of the parties to this agreement shall be the County of Fresno and the parties hereto waive the removal provisions of Code of Civil Procedure Section 394.

13. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

<u>On behalf of Owner</u>:		**<u>On behalf of Contractor</u>:**
Title –	**Financial Services Manager**	Title
Name –	**Lemuel Asprec**	Name
Signature		Signature

Address- **2220 Tulare, 6th Floor**
Fresno, CA 93721

Address

On behalf of Escrow Agent:

Title
Name
Signature
Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

Owner:

Title – **Steven White, Director**
Department of Public Works and Planning

Signature

Address- **2220 Tulare, 6th Floor**
Fresno, CA 93721

Contractor:

Title
Name

Signature

Address

Escrow Agent:

Title

Name

Signature

Address

(End Escrow Agreement)

6. Itemized Breakdown: The Contractor shall submit a financial breakdown of the work, itemized by crafts or sections as designated by the Architect or Engineer. The Contractor's payment shall be based upon the monthly percentage of completion of these items.

7. Lien Waivers: The Owner or Architect or Engineer may require the Contractor to submit, along with the progress payment request, notarized lien waivers from each Subcontractor, materials or equipment supplier. Lien waivers shall comply with Civil § Code 3262, and the aggregate sum thereof shall reflect all progress payments previously made.

D. CERTIFICATES FOR PAYMENT

1. The Architect or Engineer shall, within seven (7) days after the receipt of the Project Application for Payment, review the Project Application for Payment and either issue a Project Certificate for Payment to the Owner for such amounts as the Architect or Engineer determines are properly due, or notify the Contractor in writing of the reasons for withholding a Certificate provided in Section F of this Article 2.24.

2. The issuance of a Project Certificate for Payment will constitute a representation by the CM to the Owner that, based on the CM's observations at the site as provided herein and the data comprising the Project Application for Payment, the Work has progressed to the point indicated and that, to the best of the CM's knowledge, information and belief, the quality and timeliness of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Completion of the Work, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in the Certificate); and that based upon all currently available information, the Contractor is entitled to payment in the amount certified. However, by issuing a Project Certificate for Payment, the CM shall not thereby be deemed to represent that the CM has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, has reviewed the construction means, methods, techniques, sequences or procedures, or has made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

E. PROGRESS PAYMENTS

1. After the CM has issued a Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.

2. The Contractor shall promptly pay each Subcontractor upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contract on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to their Sub-subcontractors in similar manner.

3. The CM may on request of any Subcontractor, at the CM's discretion, furnish to that Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the CM on account of Work done by such Subcontractor.

4. Neither the Owner nor the CM shall have any obligation to pay or to see to the payment of any monies to any Subcontractor or Material Suppliers except as may otherwise be required by law.

5. Neither certification of a progress payment, delivery of a progress payment, nor partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not performed in accordance with the Contract Documents.

F. PAYMENTS WITHHELD

1. The CM may decline to certify payment and may withhold the Certificate in whole or in part to the extent necessary to reasonably protect the Owner, if, in the CM's opinion, the CM is unable to make representations to the Owner as provided herein above for Certificates for Payment. If the CM is unable to make representations to the Owner and certify payment in the amount of the Project Application, the CM will notify the Contractor as provided herein. If the Contractor and the CM cannot agree on a revised amount, the CM will promptly issue a Project Certificate for Payment for the amount for which the CM is able to make such representations to the Owner. The CM may also decline to certify payment or, because of subsequently discovered evidence or subsequent observations, the CM may nullify the whole or any part of any Project Certificate for Payment previously issued to such extent as may be necessary, in the CM's opinion, to protect the Owner from loss because of:

   a. Defective Work not remedied;
   b. Third party claims filed or reasonable evidence indicating probable filing of such claims, including claims by separate contractors;
   c. Failure of the Contractor to make payments properly to Subcontractors, or for labor, materials or equipment;
   d. Architect or Engineer’s determination, based upon reasonable evidence, that the Work cannot be completed for the unpaid balance of the Contract Sum;
   e. Damage to the Owner or another contractor;
   f. Architect or Engineer’s determination, based upon reasonable evidence, that the Work will not be accomplished in compliance with the Contract Time;
   g. Persistent failure to carry out the Work in accordance with the Contract Documents;
   h. Failure of the Contractor to submit Construction Schedules or Submittal and Procurement Schedules as required;
   i. Failure of the Contractor to maintain record drawings on a current basis;
   j. Failure of the Contractor to submit notarized lien waivers from each Subcontractor, materials or equipment supplier;
   k. Failure of the Contractor to submit certified payroll reports;
   l. Stop notice served upon the Owner.

2. A retention in the amount of one-thousand dollars ($1,000) will be withheld from the Contractor’s monthly progress payment for each and every required document not submitted in a timely manner by the Contractor or its subcontractors up to a maximum of ten-thousand dollars ($10,000). For purposes of this Paragraph, the term “required document” includes, but is not limited to, certified payrolls, labor

compliance documents, Disadvantaged Business Enterprise documents, and any other information or documents required to be submitted by the Contractor or any of its subcontractors under the terms of this Agreement or pursuant to applicable federal, state or local laws or regulations. The retention provided for in this Paragraph shall be in addition to any other deduction or retention allowed under this Agreement, and shall be in addition to any other remedy or consequence provided by law for untimely submission of any required document. Such retention shall remain in effect only until such time as the required documents have been submitted by the Contractor or its subcontractor(s) and have been determined by the Owner to be both complete and acceptable as to form.

3. When the grounds as noted above are removed, payment shall be made for amounts withheld on the basis thereof.

G. COMPLETION AND FINAL PAYMENT

1. Following the Contractor's completion of the Work, the Contractor shall forward to the CM a written notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Application for Payment. Upon receipt, the Construction Manager will promptly make such inspection. When the Construction Manager finds the Work acceptable under the Contract documents and the Contract fully performed, the CM will issue a Project Certificate for Payment which will certify the final payment due the Contractor. This certification will constitute a representation that, to the best of the IOR's knowledge, information and belief, and on the basis of observations and inspections, the Work has been completed in accordance with the Terms and Conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said Certificate, is due and payable. The CM's certification of said Project Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth herein below have been fulfilled.

2. Neither the final payment nor the remaining retainage shall become due until the Contractor submits to the CM (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, and (3) other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against any such lien. The bond cannot be from the original surety insurer for the project or any affiliate of the original surety. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien.

3. All provisions of this Agreement, including without limitation those establishing obligations and procedures, shall remain in full force and effect notwithstanding the making or acceptance of final payment, and the making of final payment shall not constitute a waiver of any claims by the Owner.

4. Upon completion and acceptance of all work whatsoever required, and upon the release of all claims against the Owner as specified, the Owner shall file a written Notice of Completion with the County Recorder as to the entire amount of work performed.

5. Final payment will be released within sixty (60) days after the date of acceptance of the Work as reflected in the Notice of Completion filed with the County Recorder's Office; provided, that Owner may withhold from the final payment, in the event of a dispute between Owner and Contractor, retentions in and amount not exceeding 150 percent of the disputed amount.

6. All manufacturer's warranties required by the Contract Documents shall commence on the date of the Notice of Completion for the Work. It shall be the Contractor's responsibility, through appropriate contractual arrangements with all subcontractors, material men and suppliers, to ensure compliance with this requirement.

7. The acceptance by the Contractor of the final payment, after the date of Notice of Completion of the Project, shall be and shall operate as a release to the Owner of all claims and of all liability to the Contractor, under the Contract Documents or otherwise, for all things done or furnished in connection with this Work, excepting only the Contractor's claims for interest upon final payment, if such final payment be improperly delayed. No payments, however, final or otherwise, shall operate to release the Contractor or his/her sureties from any obligations under the Contract Documents, including but not limited to the Performance and Payment Bonds.

2.25 CHANGES TO THE CONTRACT

A. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletion or other revisions, the Contract Sum and Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents.

B. CHANGE ORDER: A Change Order is a written order to the Contractor dually signed to show both the approval of the Architect or Engineer and Authorization of the Owner, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. Only an executed Change Order will effectuate change in either the Contract Sum and/or the Contract Time. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including any adjustment in the Contract Sum or the Contract Time, and the full and final settlement of all costs (direct, indirect and overhead) related to the Work authorized by the Change Order.

C. All claims for additional compensation to the Contractor shall be presented in writing before the expense is incurred and will be adjusted as provided herein. No work shall be allowed to lag pending such adjustment, but shall be promptly executed as directed, even if a disputed claim arises. No claim will be considered after the work in question has been done unless a written contract change order has been issued or a timely written notice of claim has been made by Contractor.

D. Costs mean an itemized breakdown of all labor (by crafts), materials, sales taxes, equipment rentals, etc., for each portion of the Work which comprises the change order including any Subcontractor's itemized breakdown, plus not more than twenty (20) percent to cover all profits and administration. The cost or credit to the Owner resulting from a change in the Work shall be determined in one or more of the following ways:

1. by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
2. by unit prices stated in the Contract Documents or subsequently agreed upon;
3. by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
4. by the method provided under Article 2.26.

E. The amount of credit to be allowed by the Contractor to the Owner, as confirmed by the CM, for any deletion or change that result in a decrease in the Contract Sum will be the amount of the actual cost. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

F. Variation in Estimated Quantities: If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order, and application or the agreed unit prices to the quantities of Work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted.

2.26 CHANGES TO THE CONTRACT (EXTRA WORK AT FORCE ACCOUNT)

A. If none of the methods set forth in Article 2.25 - D.1, D.2, or D.3 above is agreed upon, the Contractor, provided that a written order signed by the Owner is received, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the CM, on the basis of reasonable expenditures or savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, not more than twenty percent (20%) for all overhead and profit. In such case, and also under Article 2.25 - D.3 above, the Contractor shall keep and present, in such form as the Owner or the CM may prescribe, an itemized accounting of actual cost together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following:

1. Labor Cost is the cost of labor for the workers (including working foremen) used in the actual and direct performance of the extra work,

whether employed by the Contractor, or Subcontractors and Specialized Forces of any tier.

Labor Cost shall include:

a. Actual Wages paid to the workers, plus employer payments to or on behalf of the workers for health and welfare, pension, vacation, and training. If required by the CM, certified payrolls shall be submitted with extra work reports as verification of wages paid to the workers.

b. A Labor Surcharge of 20 percent (35 percent for demolition work and roofing work) will be added to the Actual Wages as defined above. The Labor Surcharge shall constitute full compensation for all payments imposed by State and Federal laws, including Workers Compensation Insurance, Social Security, and Unemployment Insurance.

c. Subsistence and Travel Allowance if actually paid to the workers. Labor Surcharge will not be added to Subsistence and Travel Allowance.

2. Equipment Cost is the payment made for the equipment actually used in the performance of the extra work.

a. Equipment valued at three hundred dollars $300 or less shall be considered as small tools, and no payment will be made therefor.

b. Equipment costs will be paid in accordance with the rental rates listed in "Cal-Trans Equipment Rental Rates, County of Fresno, Department of Public Works and Planning", in effect at the time of bid, available from the Department, Suite 711, Fresno County Plaza Building, 2220 Tulare Street, Fresno CA 93721.

c. In the event that any of the equipment to be used is not listed in the above publication, the rental rate shall be agreed upon in writing by the Contractor and the CM before the extra work is begun.

3. Materials Cost is the payment made for materials incorporated into the work.

a. Materials cost shall include sales tax, freight and delivery charges, less any available discounts whether or not said discounts are taken.

b. Materials cost shall be based upon supplier's or manufacturer's invoice. If invoices or other satisfactory evidence of cost are not furnished within sixty (60) days of delivery or within fifteen (15) days after acceptance of the contract, whichever occurs first, then the CM shall determine the materials cost, in his/her sole discretion, on the basis of available information and on his/her considered experience.

4. Specialized Services are those services or items of extra work that, by agreement of the Contractor and the CM, cannot be performed by forces of the Contractor or his/her Subcontractors, and may be performed by a specialist.

   a. Specialized services may be paid for by invoice if the established practice of the specialized force industry does not provide complete itemization of labor, equipment and materials costs.

5. Markup for Profit, Home Office and Field Office Overhead, Bond Premium, insurance, taxes and supervision will be added to the total of Labor Cost, Equipment Cost, Materials Cost and Specialized Services.

   a. Markup will be added only once on any extra work at force account, regardless of the number of contractors and subcontractors involved.

   b. It is recognized that individual contractors and subcontractors have different overhead costs, profit requirements and bond premium rates. The amount to be added to extra work for markup shall include compensation for profit, overhead and bond premium without distinguishing among these items.

   c. The markup to be added for extra work at force account on this project shall be fifteen percent (15%) plus 1-1/2% for Performance and Payment bonds for Contractor only.

6. Records shall be maintained by the Contractor and Subcontractors in such a manner as to provide a clear distinction between the costs of extra work paid for on a force account basis and the costs of other operations. From these records, the Contractor shall furnish the IOR completed extra work reports for each day's extra work to be paid for on a force account basis. Extra work reports shall itemize the materials used, equipment rental charges, and specialized services costs, and shall provide names or identifications and classifications of workmen, the hourly rate of pay, and hours worked. Extra work reports shall be compiled and submitted to the IOR daily for verification and signature. Extra work reports shall be signed by the Contractor or his/her authorized representative.

7. If the Contractor disputes the Architect or Engineer's cost determination, the Contractor may initiate a claim in compliance with the claims and disputes resolution provisions of these General Conditions.

2.27 SITE CONDITIONS

A. Where investigations have been conducted by the Owner of existing conditions on the Site, including subsurface conditions, such investigations are made for the purpose of design only and for the information of bidders. The results of such investigations represent only the statement by the Owner as to the circumstance and character of materials actually encountered by the Owner during the investigations. The Owner makes no guarantee or warranty, express

or implied, that the conditions indicated are representative of conditions existing throughout the Site of the Project or any part of it, or that unanticipated conditions might not occur.

B. All excavation work shall be performed on an "unclassified basis"; that is, such work shall include the removal of all material encountered including earth or rock formations, regardless of the type or hardness thereof, or groundwater conditions in the excavation, the cost of such excavations being included in the Contract Price at the time of bidding. Unclassified excavation Work includes drilling or blasting operations.

C. If site conditions are discovered that materially differ from previous information that the Contractor has received, and that could not have been discovered by the Contractor through prudent and reasonable investigation prior to pricing his/her bid for the work, the Contractor shall be compensated for additional costs incurred in working with the unknown site conditions, but only to the extent that such previously unknown and undiscoverable site conditions cause the Contractor to incur costs in addition to the bid price for that portion of the work. The Contractor must be able to demonstrate clearly the original bid price for that portion of the work (plus any approved change orders applicable to that portion of the work) and the additional costs incurred as a direct result of the unknown site conditions. Only additional costs over and above the amount of the original bid price for that portion of the work will be compensated upon a recommendation of approval by the Architect or Engineer.

2.28 REQUEST FOR EQUITABLE ADJUSTMENT

A. If the Contractor considers a Request for Equitable Adjustment is justified for any increase in the Contract Time, the Contractor shall promptly, upon first observance of the condition giving rise to the request, provide the CM and Owner written notice of such condition and circumstance. This notice shall be given by the Contractor before proceeding to execute the Work, except in emergency endangering life or property, in which case the Contractor shall proceed in accordance with the Emergency provisions of these General Conditions. No such request shall be valid unless so made. A Change Order shall be required to authorize any change in the Contract Time resulting from such request for equitable adjustment.

B. If the Contractor requests that additional cost or time is involved because of, but not limited to, (1) any written interpretation pursuant to Article 2.07.G, (2) any order by the Owner to stop the Work pursuant to Article 2.08 where the Contractor was not at fault, or any such order by the CM as the Owner's agent, (3) any written order for a minor change in the Work issued pursuant to Article 2.29, the Contractor shall make such request for equitable adjustment as provided in Article 2.28.A.

2.29 MINOR CHANGES IN THE WORK

The CM will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be enacted by written order issued through the CM, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

2.30 SUCCESSORS AND ASSIGNS

The Owner and the Contractor, respectively, bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other.

2.31 ASSIGNMENT OF MONEYS

The Contractor shall not assign moneys due or to become due him/her under the contract without the written consent of the Auditor-Controller of Fresno County. Any assignment of moneys shall be subject to all proper set-offs in favor of the County of Fresno and to all deductions provided for in the contract and particularly all money withheld, whether assigned or not, shall be subject to being used by the County of Fresno for the completion of the work in the event that the Contractor should be in default therein.

2.32 GUARANTEE OF WORK

A. The Contractor warrants to the Owner that all materials and equipment and the work as a whole furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents, for one (1) year from the date of Notice of Completion of the Contract, unless a longer period is otherwise specified. All manufacturer's warranties required by the Contract Documents shall commence on the date of the filing of the Notice of Completion for the Work (which date necessarily will follow the performance under separate contracts. It shall be the Contractor's responsibility, through appropriate contractual arrangements with all subcontractors, material men and suppliers, to ensure compliance with this requirement. All Work not conforming to these requirements, including substitutions not properly reviewed and authorized, may be considered defective. If required by the IOR, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

B. If repairs or changes are required in connection with guaranteed work within any guaranteed period, which, in the opinion of the CM is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the Contract Documents, the Contractor shall, promptly upon receipt of notice from the Owner, and without expense to the Owner (1) place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein, and (2) make good all damage to the building or site, or equipment or contents thereof, which, in the opinion of the IOR, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the Contract Documents; and (3) make good any work or materials, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

C. If the Contractor disturbs any work guaranteed under another contract in fulfilling the requirements of the contract or of any guarantee, embraced in or required

thereby, he/she shall restore such disturbed work to a condition satisfactory to the CM and guarantee such restored work to the same extent as it was guaranteed under such other contract.

D. The Owner may have the defects corrected if the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee and the Contractor and his/her surety shall be liable for all costs and expenses incurred in connection therewith.

E. All special guarantees applicable to definite parts of the work that may be stipulated in the Contract Documents shall be subject to the terms of this paragraph during the first (1st) year of the life of such special guarantee.

2.33 RESPONSIBILITY FOR DAMAGE

A. Neither the Owner, the Architect or Engineer, nor any officer or employee of the County, or officer or employee thereof, within the limits of which the work is being performed, shall be answerable or accountable in any manner, for any loss or damage that may happen to the work or any part thereof; or for any of the materials or other things used or employed in performing the work; or for injury to any person or persons, either workmen or the public, for damage to property from any cause which might have been prevented by the Contractor, or his/her workmen, or anyone employed by him/her, against all of which injuries or damages to persons and property the Contractor having control over such work must properly guard.

B. The Contractor shall be responsible for any liability imposed by law for any damage to any person or property resulting from defects or obstructions or from any cause whatsoever during the progress of the work or at any time before the issuance of the Notice of Completion.

C. The Contractor shall indemnify and hold harmless the Owner, the CM, the Architect, and all of their respective officers and employees, from all claims, lawsuits or actions of every kind and nature whatsoever, brought for, or on account of any injuries or damages received or sustained by any person or persons, resulting from any act or admission by the Contractor or his/her servants or agents, in the construction of the work or by or in consequence of any negligence in guarding the same, in improper materials used in its construction, or by or on account of any act or omission of the Contractor or his/her agents in the performance of Contractor's obligations under the Contract Documents. In addition to any remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall be considered necessary by the Owner may be retained by the Owner until disposition has been made of such claims, lawsuits or actions for damages as aforesaid.

2.34 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail.

2.35 RESOLUTION OF CONTRACT CLAIMS AND DISPUTES

A. A Claim is a demand or assertion by one (1) of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time, or a request for equitable adjustment or Change Order which can not be resolved per provisions of Article 2.25 - CHANGES TO THE CONTRACT. Any Claim shall be reduced to writing and filed with the IOR, within ten (10) calendar days after the Contractor has notice of the condition giving rise to the Claim, and final action per Article 2.25 - CHANGES TO THE CONTRACT procedures has taken place or has been declared as such in writing, by either party. Such ten (10)-day notice of an asserted claim is in addition to the requirement for prompt notice required per Article 2.25 - CHANGES TO THE CONTRACT.

B. The Contractor shall not claim or recover any overhead cost administrative or otherwise, particularly 'Home Office' expenses, 'Extended site overhead', or any other overhead cost on the basis of any 'Home Office' damages formula, 'Eichleay' formula, 'Total Cost' recovery formula or any other such formula.

C. REQUIREMENTS FOR FILING A CLAIM. Claims must be filed within the time specified above, but in no event later than the date of final payment. Claims shall be submitted to the IOR. The claim shall be in writing and shall be a sum certain if known. If unknown, Contractor shall specify the basis for establishing the sum certain. Claim shall include a statement of the reasons for the asserted entitlement, and include the documents necessary to substantiate the claim. Such documents may include but are not limited to payroll records, purchase orders, quotations, invoices, estimates, subcontracts, daily logs, supplier contracts, subcontract billings, bid takeoffs, equipment rental invoices, ledgers, journals, daily reports, job diaries, and any documentation related to the requirements of Article 2.25 - CHANGES TO THE CONTRACT. In the case of a continuing delay, only one (1) claim is necessary. If adverse weather conditions are the basis for a claim for additional time, such claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the critical activities on the construction schedule. The Contractor shall certify, at the time of submission of a claim, as follows:

> "I, _____, being the _____ (MUST BE AN OFFICER) of _____ (GENERAL CONTRACTOR), declare under penalty of perjury under the laws of the State of California, and do personally certify and attest that: I have thoroughly reviewed the attached claim for additional compensation and/or extension of time, and know its contents, and said claim is made in good faith; The supporting data is truthful and accurate; That the amount requested accurately reflects the contract adjustment for which the Contractor believes the Owner is liable; and, further, that I am familiar with California Penal Code Section 72 and California Government Code Section 12560, et seq, pertaining to false claims, and further know and understand that submission or certification of a false claim may lead to fines, imprisonment and/or other severe legal consequences.

By: _____ _____
(Contractor's signature) (Date)

D. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims. Any formal claim of $375,000 and under shall be processed as follows in accordance with Public Contract Code Section 20104 et. seq.:

1. For claims of less than fifty thousand dollars ($50,000), the Owner (or his/her designee), shall review the facts pertinent to the claim, obtain additional information deemed necessary for a decision (if any), review recommendations of the IOR, coordinate with the contract administrator (if any) and secure assistance from legal and other advisors, and render a written decision on the claim within forty-five (45) days of receipt of the claim. If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner (or his/her designee) and claimant. The Owner (or his/her designee's) written response to the claim, as further documented, shall be submitted to the claimant within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

2. For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Owner (or his/her designee) shall review the facts pertinent to the claim, obtain additional information deemed necessary for a decision (if any), review recommendations of the IOR, coordinate with the contract administrator (if any) and secure assistance from legal and other advisors, and render a written decision on the claim within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the Owner may have against the claimant. If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner (or his/her designee) and the claimant. The Owner (or his/her designee's) written response to the claim, as further documented, shall be submitted to the claimant within thirty (30) days after receipt of the further documents, or a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

3. If the claimant disputes the written response of Owner (or his/her designee), or fails to respond within the time prescribed, the claimant may so notify the Owner (or his/her designee), in writing, either within fifteen (15) days of receipt of the Owner (or his/her designee's) response or within fifteen (15) days of the Owner (or his/her designee's) failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the Owner (or his/her designee) shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

4. If following the meet and confer conference the claim or any portion remains in dispute, the claimant may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his/her written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference.

E. Procedures for Civil Actions to Resolve Disputed Claims: Non-binding Mediation: Within sixty (60) days, but no earlier than thirty (30) days, following the filing of a responsive pleading, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation by both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediation, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause shown to the court. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

Judicial Arbitration: If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of the code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subsection consistent with the rules pertaining to judicial arbitration. Arbitrators shall be experienced in construction law.

Appeals: As provided by statute (specifically Public Contract Code section 20104.4(b)(3) and Code of Civil Procedure section 1141.21), any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees, also pay the attorneys' fees on appeal of the other party.

F. CLAIMS AND DISPUTES EXEMPT FROM FILING REQUIREMENTS. The requirements and procedures imposed by this Article do not apply to:

1. Any claims by the Owner;

2. Any claim for or respecting personal injury or death or reimbursement or other compensation arising out of or resulting from liability for personal injury or death;

3. Any claim or dispute relating to stop payment requests or stop notices;

4. Any claim or dispute related to the approval, refusal to approve, or substitution of Subcontractors, regardless of tier, and suppliers; and

5. Any claim in excess of three hundred seventy-five thousand dollars $375,000.

G. PAYMENT OF UNDISPUTED PORTION OF CLAIM. Owner shall pay claimant such portion of a claim that is undisputed except as otherwise provided in the contract.

H. CONTINUE WORK DURING DISPUTE. In the event of any disputed claim or other dispute between the Owner and the Contractor, the Contractor will not stop work but will prosecute the work diligently to completion in his/her manner directed by the Owner, and the dispute shall be resolved by a court of law after completion of the Work. However, Contractor must submit all disputes in accordance with the provisions of Article 2.35.

I. SUIT IN FRESNO COUNTY ONLY. Any litigation arising out of this Contract shall be brought in Fresno County and Contractor hereby waives the removal provisions of California Code of Civil Procedure Section 394.

2.36 PERFORMANCE BOND, LABOR AND MATERIAL PAYMENT BOND AND WARRANTY BOND

A. The Contractor shall furnish Performance Bond in the amount of one hundred percent (100%) of the Contract amount, Payment Bond in the amount of one hundred percent (100%) of the Contract amount and One Year Warranty Bond in the Amount of ten percent (10%) of the final Contract Amount.

B. All bonds required, whether Bid bonds, Performance, Payment, Warranty or other bonds, shall be issued by an admitted surety insurer. The same admitted surety insurer must issue the Bid Bond, Performance Bond, Payment Bond, and Warranty Bond. The payment, performance and warranty bonds required by these specifications will neither be accepted nor approved by the Owner unless the bonds are underwritten by an admitted surety and the requirements of California Code of Civil Procedure section 995.630 are met. The bonds must include a physical mailing address, phone number, FAX number, and contract person for the admitted surety insurer. The Owner further reserves the right to satisfy itself as to the acceptability of the surety and the form of bond**.** Upon request of the Owner, the bidder must submit the following documents:

1. The original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws, or other instrument authorizing the person who executed the bond to do so.

2. A certified copy of the certificate of authority of the insurer issued by the California Insurance Commissioner.

3. A certificate from the county clerk that the certificate of authority has not been surrendered, revoked, canceled, annulled, or suspended, or in the event that it has, that renewed authority has been granted.

4. A financial statement of the assets and liabilities of the insurer to the end of the quarter calendar year prior to thirty (30) days next preceding the date of the execution of the bond, in the form of an officers' certificate as defined in Corporations Code §173.

2.37 RIGHTS AND REMEDIES

A. The duties and obligations imposed by the Contract Documents and the rights and remedies available hereunder shall be in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

B. No action or failure to act by the Owner, or by the CM or Architect, regarding any deficiency, breach or default in performance by the Contractor under the Contract Documents, shall be deemed or construed to constitute acquiescence of the Owner in connection therewith or with regard to any subsequent deficiency, breach or default in performance by the Contractor; nor shall any such prior act of failure to act by or on behalf of Owner be deemed or construed as a waiver of any rights in favor of Owner regarding any such deficiency, breach or default in performance by the Contractor, regardless of the similarity to the prior incident or circumstance when no action was taken regarding any alleged deficiency, breach or default in performance by the Contractor.

2.38 TIME, DELAYS AND LIQUIDATED DAMAGES

A. DEFINITIONS

1. Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for completion of the Work, including authorized adjustments thereto.

2. The Date of Commencement of the Work is the date established in the Notice to Proceed.

3. The Date of Completion of the Work is the date of which the work is certified as complete by the Architect or Engineer as specified in the Notice of Completion.

4. The term “day” as used in the Contract Documents shall mean calendar day unless specifically designated otherwise.

B. PROGRESS AND COMPLETION

1. Time is of the essence regarding all time limits stated in the Contract Documents. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

2. The Contractor shall begin the Work on the Date of Commencement. The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required herein to be furnished by the Contractor. The Date of Commencement of the Work shall not be changed by the effective date of such insurance.

3. The Contractor shall carry the Work forward expeditiously with adequate forces and shall achieve Completion of the Work within the Contract Time.

C. DELAYS AND EXTENSIONS OF TIME

1. Delays in prosecution of parts or classes of the Work that are not demonstrated to prevent or delay completion of the entire Project or specific milestones within the Contract Time are not "unavoidable delays" for purposes of this section.

2. In all cases, the time authorized for extension of the Contract Time shall be no greater than the number of days directly attributable to the event or circumstances which causes unavoidable delay in the completion of the Project. Contractor shall be entitled, in the case of unavoidable delays, to an extension in the Contract time, but not to any increase to the Contract price. "Unavoidable delay" for this purpose shall be defined as follows:

   a. Unavailable Materials. That materials or articles called for in the Contract Documents are not obtainable within the time required for timely completion; provided that such materials or articles were listed by the Contractor in the schedule required by Article 2.17 - CONTRACTOR'S CONSTRUCTION SCHEDULE; that the Contractor demonstrates that the unavailability of the materials is in fact the cause for the delay, and could not have been avoided by an appropriate adjustment in the Construction Schedule; and that the unavailability of such materials is due to circumstances beyond the Contractor's control. If good cause for delay is demonstrated pursuant to this subsection, the Owner, at its sole discretion, may grant a time extension.

   b. Force Majeure. That delays in construction have resulted from circumstances beyond the control of the Contractor and which the Contractor could not have provided against by the exercise of reasonable care, prudence, foresight, and diligence. Unavoidable delays within the meaning of this subparagraph shall be those caused by acts of God, war, insurrection, civil disorder, fire, floods, epidemic, or strikes.

   c. Unseasonable Weather. An extension of time may be granted due to weather which is unsuitable for the Work currently in progress, upon the determination of the Owner that the weather conditions in fact caused the delay in completion of the Project and that such weather conditions were not, and could not in the exercise of reasonable diligence, have been foreseen by the Contractor. Seasonable weather that, in the exercise of reasonable foresight and diligence, should be expected in the area at the time of year in question is not cause for an extension of time.

   d. Time Extensions Due to Change Orders or Work Authorizations. A time extension may be granted due to additional work that results in a delay in the Project caused by the approval by the Owner of a Change Order or Work Authorization. The Contractor shall be entitled to a time extension Change Order only when the extra Work is demonstrated by the Contractor to have caused a delay in the Project.

   e. Owner Caused Delays. In the event that the Project is delayed by acts of the Owner not authorized by the Contract Documents

which the Contractor demonstrates will or have caused an unavoidable delay, the Contractor shall be entitled to a Contract Time Change Order to offset the extra time incurred by the Contractor. The Contractor will not be entitled to adjustments in the contract price. Extra time shall be limited to that which is directly identified as critical by the delay.

4. The Contractor specifically agrees that a time extension as provided herein is its sole remedy for Owner-caused delays, and agrees to make no claim or demand for additional damages, nor claim an acceleration of the time for performance.

5. The Contractor shall not be entitled to any Contract Time extension nor Contract Price adjustment for alleged Owner delays if the Owner has acted within the time limits specified by the Contract Documents.

D. NOTICE OF DELAYS

1. Contractor shall notify the CM promptly whenever the Contractor foresees any event or circumstance that may delay the prosecution of the Work and in Contractor's opinion may provide grounds for an extension, and shall in any event notify the CM immediately upon the occurrence of any such delay. The Contractor shall take immediate steps to prevent, if possible, the occurrence or continuance of the delay. If this cannot be done, the CM shall determine how long the delay shall continue and to what extent the prosecution and completion of the Work are being delayed thereby. Such notification shall specify with detail the cause asserted by the Contractor to constitute grounds for an extension. Failure of the Contractor to submit such a notice within ten (10) days after the initial occurrence of the event-giving rise to the delay shall constitute a waiver by the Contractor of any request for a time extension, and no extension shall be granted as a consequence of such delay.

2. If the Contractor believes that the delay in prosecution in the Work will result in an unavoidable delay in completion of the entire Project, the Contractor shall submit evidence to support that belief, together with its request for a time extension. Such evidence shall include a demonstration that the delayed portion of the Work will affect the Critical Path Scheduling of the entire Project. The Contractor shall also submit a proposed revised Construction Schedule, which accounts for the delay in completion of the entire Project caused by the delay in prosecution of part of the Project, and includes a revised Critical Path demonstrating how the Project will be completed within the proposed revised Contract Time.

E. INVESTIGATION; PROCEDURE.

1. Upon receipt of a request for Contract Time extension, the CM shall conduct an investigation of the facts asserted by the Contractor to constitute grounds for an extension. The results of this investigation shall be reported by the CM to the Contractor and shall indicate whether he/she will recommend for or against such extension to the Owner. The performance of this investigation by the CM shall not be construed as direction or recommendation to the Contractor regarding scheduling of

the work. Scheduling this work is the sole responsibility of the Contractor.

2. The CM may, in his/her sole discretion, defer this recommendation to allow the accumulation of time extensions due to Work Authorizations into a periodic or final Change Order request.

3. Upon receiving the Architect or Engineer's recommendation to the Owner regarding the Contractor's request for a time extension, the Contractor may either withdraw its application for extension or request that it be scheduled for action by the Owner. If the Owner disallows the request, there shall be no allowance made for the time during which the request was pending, and the Contractor shall remain obligated to complete the Work in the time specified.

4. If the Owner approves the time extension Change Order, the new Construction Schedule submitted by the Contractor and approved by the Owner shall be deemed to amend the original Construction Schedule approved by the Owner; thereafter, the amended Construction Schedule shall have the same force and effect as the originally approved Progress Schedule.

5. The revised Construction Schedule must be submitted within seven (7) calendar days of the date in which the Owner approves the change.

6. The Contractor agrees that the Owner's determination as to the existence of grounds for an extension and, the duration of any such extension, shall be final and binding upon both Owner and Contractor.

F. DISCRETIONARY TIME EXTENSION FOR BEST INTEREST OF OWNER

1. The Owner reserves the right to extend the Contract Time for completion of the Work if the Board of Supervisors determines that such extension is in the best interest of the Owner.

2. In the event that such discretionary extension is made at the request of the Contractor, the Owner shall have the right to charge to the Contractor all or any part, as the Board may deem proper, of the actual cost to the Owner for engineering, inspection, supervision, contract administration, incidental and other overhead expenses that accrue during period of such extension, and to deduct all or any portion of such amounts from the final payment for the Work.

3. In the event such extension is ordered over the objection of the Contractor, the Contractor shall be entitled to a Change Order adjusting the price paid to reflect the actual costs incurred by the Contractor as a direct and proximate result of the delay, upon his/her written application therefor, accompanied by such verification of costs as the CM requires. Only additional direct costs incurred at the site will be reimbursable by Change Order.

G. LIQUIDATED DAMAGES

1. If the Work is not completed by Contractor in the time specified in the Agreement for Construction or within any period of extension authorized

pursuant to this Article, the Contractor acknowledges and admits that the Owner will suffer damage, and that it is impracticable and infeasible to fix the amount of actual damages. Therefore, it is agreed by and between the Contractor and the Owner that the Contractor shall pay to the Owner as fixed and liquidated damages, and not as a penalty, the sum specified in Section 00 52 13, Agreement, Article III for each calendar day of delay until the Work is completed and accepted, and that both the Contractor and the Contractor's surety shall be liable for the total amount thereof, and that the Owner may deduct said sums from any monies due or that may become due to the Contractor.

2. This liquidated damages provision shall apply to all delays of any nature whatsoever, save and except only unavoidable delays approved by the Owner pursuant to provisions herein above, or discretionary time extensions approved by the Board of Supervisors pursuant to provisions hereinabove.

H. EXTENSION OF TIME NOT A WAIVER.

1. Any extension of the Contract Time granted pursuant to this Article shall not constitute a waiver by the Owner, nor a release of the Contractor, from his/her obligations to perform this Contract in the Contract Time.

2. Granting of a time extension due to one (1) circumstance on one (1) request therefore shall not constitute a granting by the Owner of an extension of time for any other circumstance or the same circumstance occurring at some other time, and shall not be interpreted as a precedent for any other request for extension.

2.39 PROTECTION OF PERSONS AND PROPERTY

A. SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

B. SAFETY OF PERSONS AND PROPERTY

The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

1. All employees on the Work and all other persons who may be affected thereby;

2. All the work and all materials and equipment to be incorporated therein, whether in storage or off the site, and that is under the care, custody or control of the Contractor or any of the Contractor's Subcontractors or Sub-subcontractors;

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and

4. The work of the Owner or other separate contractors.

C. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

D. The Contractor shall erect and maintain, as required by existing conditions and the progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent facilities.

E. When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

F. The Contractor shall promptly remedy all damage or loss to any property referred to above caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, anyone directly or indirectly employed by any of them, or any one for whose acts any of them may be liable, and for which the Contractor is responsible under the above noted clauses, except damage or loss attributable solely to the acts or omissions of the Owner, the CM, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable in any degree to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under the Indemnification provisions provided herein.

G. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and the CM.

H. The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

I. EMERGENCIES

In any emergency affecting the safety of persons or property the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in the provisions herein for Changes in the Work.

2.40 INSURANCE

A. CONTRACTOR'S INSURANCE

1. Bidders' attention is directed to the insurance requirements below. It is highly recommended that Bidders confer with their respective insurance carriers or brokers to determine in advance of bid submission the availability of the insurance certificates and endorsements required

below. A bidder who is awarded a contract and thereafter fails to comply strictly with the insurance requirements, will be deemed to be in default of its obligations.

2. Contractor shall procure, and maintain for the duration of the Contract, insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his/her agents, representatives, employees or Subcontractors. The cost of such insurance shall be included in the Contractor's bid.

3. No later than ten (10) calendar days following the Award of the Contract, and prior to execution of the Agreement for Construction by the Owner, the Contractor shall submit certificates of insurance, signed by an authorized agent of the insurer, attesting to insurance coverage of the Contractor as required by this Article.

B. MINIMUM SCOPE OF INSURANCE.

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage ("occurrence" form CG0001).

2. Insurance Services Office Business Auto Coverage form number CA 0001 0187 covering Automobile Liability, code 1 "any auto".

3. Workers' Compensation insurance as required by the Labor Code of the State of California and Employers Liability insurance.

C. MINIMUM LIMITS OF INSURANCE.

Contractor shall maintain limits no less than:

1. General Liability: One million dollars ($1,000,000.00) combined single limit per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be three times the required occurrence limit.

2. Automobile Liability: One million dollars ($1,000,000.00) combined single limit per accident for bodily injury and property damage.

3. Workers' Compensation and Employers Liability: Workers' compensation limits as required by the Labor Code of the State of California and Employers Liability limits of one million dollars ($1,000,000.00) per accident.

D. DEDUCTIBLES AND SELF-INSURED RETENTIONS.

Any deductibles or self-insured retentions must be declared to and approved by the Owner. If approved at the option of the Owner, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers, officials, employees and volunteers; or the Contractor shall

procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expense.

E. OTHER INSURANCE PROVISIONS.

The policies are to contain, or be endorsed to contain, the following provisions:

1. Fire Insurance / Builders Risk Insurance.

a. The Contractor shall secure "All Risk" type Builder's Risk Insurance for the Work to be performed pursuant to this Agreement. The policy shall cover not less than losses due to fire, explosion, vehicle damage, theft, flood, earthquake and civil commotion with no coinsurance penalty provision.

b. The Contractor shall obtain and keep in force insurance against loss or damage by fire and the customary extended perils including windstorm, hail, explosion, aircraft, vehicle, smoke, riot, and civil commotion, vandalism, sprinkler leakage (including earthquake) as covered under the standard forms of California Standard Fire Insurance Policy for school projects or Factory Insurance Association and/or Factory Mutual Insurance Company for projects other than schools. The policy shall cover the entire structure on which the work of this contract is to be done, up to the full insurable value thereof, including items of labor and materials connected therewith on the site, materials in place or to be used as part of the permanent construction including materials stored and partially paid for by the Owner as provided in Division 01-General Requirements, surplus materials, shanties, protective fences, bridges, or temporary structures, miscellaneous materials and supplies incident to the work, and such scaffolding, staging, towers, forms and equipment as are not owned or rented by the Contractor, the cost of which is included in the cost of the work. EXCLUDED: This insurance does not cover any tools owned by mechanics, any tools, equipment, scaffolding, staging, towers, and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the Work, or any structures erected for the Contractor's administration of the Project. The loss, if any, is to be adjustable with and payable to the Owner as trustee for the insured as their interests may appear, except in such cases as may require payment of all or a proportion of said insurance to be made to a mortgagee or trustee as its interest may appear.

c. The Owner shall be named as insured jointly with the Contractor and other proper parties, all as their respective interests may appear. All subcontractors shall be insured to the extent of their portion of the work under the Contractor. The Owner, Contractor and all subcontractors waive all rights, each against the others, for damages caused by fire or other perils covered provided under the terms of this article, except such rights as they may have to the proceeds of the insurance held by the party obtaining and maintaining the insurance policy in force who acts as trustee of said policy. Certificates of such insurance shall be filed with the Owner. If the Contractor fails to effect or maintain insurance

as above and so notifies the Owner, the Owner may insure his own interest and charge the cost thereof to the Contractor.

d. In the event of a partial or total destruction by the perils insured against, of any or all of the work and/or materials herein provided for, at any time prior to the final completion of the Contract and the final acceptance by the Owner of the Work or materials to be performed or supplied thereunder, the Contractor shall promptly reconstruct, repair, replace, or restore all work or materials so destroyed or injured at his sole cost and expense. Nothing herein provided for shall in any way excuse the Contractor or his surety from the obligation of furnishing all the required materials and completing the work in full compliance with the terms of the Contract.

2. Commercial General Liability and Automobile Liability Coverages.

a. The Contractor shall secure Commercial General Liability Insurance with limits of not less than One Million Dollars ($1,000,000.00) per occurrence and an annual aggregate of Three Million Dollars ($3,000,000.00). This policy shall be issued on a per occurrence basis. The Owner may require specific coverage including completed operations, product liability, contractual liability, XCU, fire legal liability or any other liability insurance deemed necessary because of the nature of the contract. The Owner, its officers, officials, employees, agents, including Consulting Engineers while performing contract administration services, and volunteers are to be covered as insured as respects all of the following**:** liability arising out of activities performed by or on behalf of the Contractor, including the insured's general supervision of the Contractor; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by or on behalf of the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers.

b. The Contractor's insurance coverage shall be primary insurance as respects the owner, its officers, officials, employees, agents, Consulting Engineers, and volunteers. Any insurance or self-insurance maintained by the Owner, its officers, officials, Employees, agents, Consulting Engineers, or volunteers shall be in excess of the Contractor's insurance and shall not contribute with it.

c. Any failure to comply with reporting provisions of the policies shall not affect Coverage provided to the Owner, its officers, officials, employees, agents, Engineers, Consulting Engineers, or volunteers.

d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

e. Such Commercial General Liability insurance shall name the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by Owner, its officers, agents and employees shall be excess only and not contributing with insurance provided under Contractor's policies herein. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to Owner. Contractor shall obtain endorsements to the Commercial General Liability insurance policy naming Owner as an additional insured and providing for a thirty (30) day prior written notice of cancellation or change in terms or coverage

f. Comprehensive Automobile Liability Insurance with limits of not less that One Million Dollars ($1,000,000) per accident for bodily injury and property damage. Coverage should include owned and non-owned vehicles used in connection with this Agreement and all applicable endorsements.

3. Professional Liability Coverage.

If Contractor employs licensed professional staff, (*e.g.,* Ph.D., R.N., L.C.S.W., M.F.C.C.) in providing services, the Contractor shall secure Professional Liability Insurance with limits of not less than one million dollars ($1,000,000.00) per occurrence, and three million dollars ($3,000,000.00) annual aggregate, with a provision for three (3) year tail coverage.

4. Worker's Compensation and Employers Liability Coverage.

The Contractor shall obtain a policy of Worker's Compensation insurance in accordance with applicable provisions of the California Labor Code. The insurer shall agree to waive all rights of subrogation against the Owner, its officers, officials, employees and volunteers for losses arising from work performed by the Contractor for the Owner. Contractor shall supply the Owner with certificates of insurance in triplicate, evidencing that Workers Compensation Insurance is in effect and providing that the Owner will receive 30 days' notice of cancellation. If Contractor self-insures Workers Compensation, Certificate of Consent to Self-Insure shall be provided to the Owner.

5. All Coverages.

Prior to the commencement of performing its obligations under this Agreement, Contractor shall provide certificates of insurance and upon request from Owner, formal endorsements for the foregoing policies, as required herein, to the Owner, listing the name and address of the official who will administer this contract, and stating that such insurance coverage have been obtained and are in full force; that the County of Fresno, its officers, agents and employees will not be responsible for any premiums on the policies; that such Commercial General Liability insurance names the County of Fresno, its officers, agents and

employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned; that such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by Owner, its officers, agents and employees, shall be excess only and not contributing with insurance provided under Contractor's policies herein; and each insurance policy required by this Section 2.40 shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice has been given to the Owner.

F. ACCEPTABILITY OF INSURERS

Contractor shall obtain the policies and coverages specified herein from an admitted insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and having a Best's rating of no less than **A** and FSC **VIII**.

G. VERIFICATION OF COVERAGE

Contractor shall furnish the Owner with certificates of effecting coverage required by this clause. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates are to be received and approved by the owner before work commences. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time. In the event Contractor fails to keep in effect at all times insurance coverage as herein provided, the Owner may, in addition to other remedies it may have, suspend or terminate this Agreement upon the occurrence of such event. The Certificate of Insurance shall be issued in triplicate, and provided to the Owner within ten (10) days of award, and also shall be provided to all other participating agencies who contribute to the cost of the work or have jurisdiction over areas in which the work is to be performed and all officers and employees of said agencies while acting within the course and scope of their duties and responsibilities.

H. SUBCONTRACTORS

Contractor shall include all Subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each Subcontractor. All coverages for Subcontractors shall be subject to all of the requirements stated herein.

2.41 UNCOVERING WORK

A. If any portion of the Work should be covered contrary to the request of the CM, IOR, Owner, public authority having jurisdiction, or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Engineer, be uncovered for their observation and shall be replaced at the Contractor's expense.

B. If any other portion of the Work has been covered which the Engineer, Owner or public authority having jurisdiction has not specifically requested to observe prior to its being covered, the Engineer may request to see such Work and it shall be uncovered by the Contractor. If such Work is found in accordance with the

Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided herein in these General Conditions, in which event the Owner shall be responsible for the payment of such costs.

2.42 CORRECTION OF WORK

A. The Contractor shall promptly correct all Work rejected by the Engineer as defective or as failing to conform to the Contract Documents, whether or not fabricated, installed or completed. The Contractor shall submit a plan of action, within twenty-four (24) hours of notification of the rejected work by the Engineer, for correcting the rejected work. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Engineer's and Architect's additional services made necessary thereby.

B. If, within one (1) year after the date of acceptance of the Work as specified in the Notice of Completion, or designated portion thereof, or within one (1) year after acceptance by the Owner of designated equipment, or within such longer period of time as may be prescribed by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found by Owner to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive both final payment for the Work or designated portion thereof and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

C. The Contractor shall, at his/her sole expense, remove from the site all portions of the Work that are defective or nonconforming and which have not been corrected under Articles 2.32, 2.42.A, and 2.42.B, unless the Owner waives removal.

D. If the Contractor fails to submit a plan of action, within twenty-four (24) hours of notification of the rejected work by the Engineer, for correcting the rejected work, or fails to correct defective or nonconforming Work as provided herein in Articles 2.32, 2.42.A, and 2.42.B, the Owner may correct it in accordance with Article 2.08.C.

E. If the Contractor does not take action under the plan to initiate such correction of such defective or nonconforming Work within ten (10) days of written notice from the Engineer, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, the Owner may, upon ten (10) additional days' written notice, sell such Work at auction or at private sale and shall account for the proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the CM, IOR, Architect, or other Professional's additional services made necessary thereby. If such proceeds of sale do not cover all costs that the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

F. The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

G. Nothing contained in this Article 2.42 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Article 2.32 hereof. The establishment of the time periods noted in this Article 2.42, or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

2.43 ACCEPTANCE OF DEFECTIVE OR NONCONFORMING WORK

If the Owner prefers to accept defective or nonconforming Work, the Owner may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Amount where appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made. Engineer shall determine the amount of reduction in the Contract Amount.

2.44 TERMINATION BY THE OWNER

A. If the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of the Contractor's insolvency, or stop notices are served upon the Owner, or if the Contractor persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards applicable laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, and fails after written notice to commence and continue correction of such default, neglect or violation with diligence and promptness, the Owner upon certification by the Engineer that sufficient cause exists to justify such action, may, after an additional written notice and without prejudice to any other remedy the Owner may have, terminate the Contract and take possession of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever methods the Owner may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

B. If the unpaid balance of the Contract Amount exceeds the costs of finishing the Work, including compensation for the CM's, IOR's and Architect's additional services made necessary thereby, Contractor will only be paid for his/her actual unpaid costs from such excess. If such costs exceed the unpaid balance, the contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Engineer, upon application, in the manner provided in Article 2.24 and this obligation for payment shall survive the termination of the Contract.

2.45 SUBSTITUTION OF MATERIALS

A. When a specific manufacturer, trade name or material is specified, or indicated, it is to establish a standard of quality and shall not be construed as limiting competition. The intent of the Contract Documents is to specify high-grade standard material and equipment, and it is not the intent of these Contract Documents to exclude or omit the products of any responsible manufacturer, if such products are equally acceptable in terms of quality, finish, performance, durability, and serviceability, in the judgment of the Owner and the Architect, to those specified herein. Wherever an article, or any class of materials, is specified by the trade name or by the name of any particular patentee, manufacturer or dealer, it shall be taken as intending to mean and specify the article of material described or any other equal thereto in quality, finish, performance, durability, and serviceability, in the judgment of the Owner and the Architect, for the purpose for which it is or they are intended.

B. If the Contractor desires to use material or equipment other than that specified, he/she shall submit a request for approval of such substitution, in writing, to the Architect/Engineer by no later than 10 days prior to bid opening. Substitution requests will not be considered if received after the time stipulated.

C. The Owner does not guarantee that alternative articles, components, materials or equipment other than the item specified by trade name or other specific identification, will fit within the design parameters of the project without alteration of the project design by the Contractor.

D. The Owner has the right to reject any proposed alternative material which requires alteration of the project design which impacts the safety of the public or the user of the completed facility. If the proposed alternative material requires alteration of the design of the Project or any aspect thereof and said alterations are acceptable to the Owner, the Contractor shall be responsible for performing said alterations at no additional cost to the Owner.

E. Submittals for approval of substitute materials shall contain sufficient detailed information, descriptive brochures, drawings, samples or other data as is necessary to provide a detailed side-by-side comparison to the specified materials. It is the sole responsibility of the Contractor to submit complete descriptive and technical information so the Engineer and the Architect can make proper appraisal. Lack of either proper or sufficient information shall constitute cause for rejection. Reference to product data will not be acceptable.

F. It is the Contractor's responsibility to confirm and correlate all quantities and dimensions and coordinate with all trades whose work may be affected by the requested substitution.

2.46 REFERENCE TO STANDARDS

A. Reference to known standards shall mean and intend the latest edition or amendment published prior to date of these Specifications, unless specifically indicated otherwise, and to such portions of it that relate and apply directly to the material or installation called for on the Project.

B. Where material is specified solely by reference to standard specifications, the Contractor shall, if requested by the Engineer, submit to the Engineer for his/her approval, data on all such material proposed to be incorporated into the Work of the Contractor, listing the name and address of the vendor, the manufacturer or producer, and the trade or brand names of such materials.

2.47 SPECIFICATIONS

A. The Specifications are organized into Divisions, Sections, and Trade headings based on the Construction Specifications Institute's 49-Division format and the Master format numbering system. This organization shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of the Work to be performed by any trade. The Contractor shall be responsible for examining all Sections of the Specifications for inter-related items of the Work, and for furnishing each item identified or specified.

B. No responsibility will be assumed by the Owner, Architect or the CM for omissions or duplications by the Contractor in the completion of the Contract due to any alleged discrepancy in the arrangement of the material in these Specifications, nor shall any such segregation of work and materials operate to make the IOR an arbiter in defining the limits to the agreements between the Contractor and his/her Subcontractors or suppliers.

C. The misplacement, addition or omission of any letter, word or punctuation mark shall in no way damage the true spirit, intent or meaning of these Specifications.

D. The words "shown", "indicated", "noted", "scheduled" or words of that effect shall be understood to mean that reference is made to the Drawings accompanying these Specifications.

E. Where reference herein is made to colors or finishes "as selected", the reference is to the Architect with concurrence by the Owner.

2.48 APPROVED APPLICATORS

A. Where specific instructions in these Specifications require that a particular product and/or materials be installed and/or applied by an "approved applicator" of the manufacturer, it shall be the Contractor's responsibility to insure that any Subcontractors used for such work be approved applicators.

B. Contractor accordingly shall bear any and all costs, and shall reimburse Owner for any such costs incurred by Owner, resulting from Contractor’s failure to insure the use of an “approved applicator”.

2.49 DELIVERY AND STORAGE OF MATERIALS

A. Deliver all manufactured materials in the original packages, containers or bundles (with the seals intact), bearing the name or identification mark of all manufacturers.

B. Deliver fabrications in as large assemblies as practicable and where specified to be shop-primed or shop-finished; they shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.

C. Store all materials in such manner as necessary to properly protect same from damage, as materials or equipment damaged by handling, weather, dirt or from any other cause will not be acceptable.

D. Store materials so as to cause no obstructions (i.e. stored off all sidewalks and other walkways, roadways, and underground services). The Contractor shall be responsible for protecting from damage all material and equipment furnished under the Contract.

2.50 QUALITY OF WORK

A. Where not more specifically described in any of the various Sections of these Specifications, the quality of work shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction, or installation regularly furnished or required for completion of the work (including any finish), and for successful operation as intended of the project and the component thereof corresponding to that work.

B. All Work shall be executed by mechanics skilled in their respective lines of work.

C. When completed, all parts shall have been durably and substantially built and shall present a neat, finished appearance.

2.51 HOURS OF WORK

A. Eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated that no worker employed at any time by the Contractor, or by a Subcontractor under this Contract, upon the Work, shall be required or permitted to work thereon more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week, except as provided in Sections 1810-1815 inclusive, of the Labor Code of the State of California, all the provisions of which are deemed to be incorporated herein as if set forth in full; and it is further expressly stipulated that for each and every violation of said last named stipulation, said Contractor shall forfeit, as a penalty to the Owner, fifty dollars ($50.00) for each worker employed by the Contractor in the execution of this Contract, for each calendar day during which said worker is required or permitted to labor more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week in violation of any of said provisions of the Labor Code.

B. Notwithstanding the above stipulations, pursuant to Section 1815 of the Labor Code, work performed by employees of contractors in excess of eight (8) hours per day and forty (40) hours during any one (1) week shall be permitted on the Project upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and a half (1 1/2) times the basic rate of pay.

2.52 WAGE RATES

A. Pursuant to Section 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rates of wages and rates for legal holidays and overtime in the locality in which this work is to be performed, which under Labor Code Section 1773.1 are deemed to include employer payments for health and welfare, pension, vacation, travel time and subsistence pay, and apprenticeship or other authorized training programs, for each craft or type of worker or mechanic needed to perform this contract. Said wage rates are available only at the Fresno County Department of Public Works and Planning, Design Division, and will be made available to any interested person upon request. Minimum wage rates for this Project, as predetermined by the Secretary of Labor, are set forth in the Special Provisions. If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the Prevailing Wage Rates predetermined by the Director of the Department of Industrial Relations of the State of California for similar classifications of labor, the contractor and his subcontractors shall pay not less than the higher wage rate.

B. It shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any Subcontractor under him/her to pay not less than the said specified rates to all laborers, workers, and mechanics employed by them in the execution of the Contract, and to pay all laborers, workers and mechanics not less often than once weekly. The Contractor to whom the Contract is awarded shall post a copy of the determination of prevailing wages at the job site. The Contractor shall require all Subcontractors to comply with Sections 1770-1780 of the Labor Code of the State of California and shall insert into every subcontract the requirements contained therein.

C. The Contractor shall comply with Labor Code Section 1775. In accordance with said Section 1775, it is hereby further agreed that the Contractor shall forfeit to the Owner, as a penalty, fifty dollars ($50.00) for each laborer, worker, or mechanic employed for each calendar day or portion thereof, who is paid less than the said stipulated rates for any work done under the Contract, by him/her or by any Subcontractor under him/her. The difference between said stipulated rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than said stipulated rate shall be paid to each worker by the Contractor. The Contractor, and each Subcontractor, shall keep or cause to be kept an accurate record showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by him/her or her in connection with the public work. The records shall be open at all reasonable hours to the inspection of the Owner, to its officers and agents, and to the Division of Labor Law Enforcement of the State Department of Industrial Relations, its deputies and agents, or as otherwise provided by applicable law (including but not limited to Labor Code 1776).

D. In case it becomes necessary for the Contractor or any Subcontractor to employ on the Work under this Contract any person in a trade or occupation (except executive, supervisory, administrative, clerical or other non-manual workers as such) for which no minimum wage rate is specified, the Contractor shall immediately notify the Owner who shall promptly thereafter determine the prevailing rate for such additional trade or occupation from the time of the initial employment of the person affected and during the continuance of such employment.

2.53 APPLICATION OF HIGHEST STANDARDS AND REQUIREMENTS

Whenever two (2) or more standards or requirements appear in these General Conditions or in any other part of the Contract Documents that form the Contract, the highest standard or requirement shall be applied and followed in the performance under this Contract.

2.54 NONDISCRIMINATION IN EMPLOYMENT

A. Federal and State Laws prohibit discrimination in employment. The California Fair Employment Practices Act (Labor Code Section 1410 to 1433) prohibits discrimination in employment on the basis of race, religion, color, sex, physical handicap, medical condition, marital status, age, national origin or ancestry, and applies to all employers, employment agencies and labor organizations.

B. Title VII of the Federal 1964 Civil Rights Act (42 U.S.C. Section 2000e - 2000e - 17) prohibits employment discrimination on the basis of race, color, sex, religion, or national origin, and applies to all employers that employ at least fifteen (15) workers during each working day in each of twenty (20) or more calendars weeks in the current or preceding year.

C. In addition to these two (2) laws of general application, there are other Federal and State laws that prohibit employment discrimination in particular cases.

D. The Owner is an Affirmative Action Employer and expects all of its contractors and suppliers to familiarize themselves with, and comply with, all applicable laws relating to employment discrimination.

E. To the extent required by law, the Contractor shall meet all requirements of law relating to the participation of minority, women, and disabled veteran business enterprise contracting goals, and shall comply with Public Contract Code 10115 et seq. and all applicable regulations. Contractor further agrees that, when required, Contractor shall ensure compliance by all Subcontractors and shall complete all forms required by all agencies exercising jurisdiction over the project.

2.55 APPRENTICES

A. Pursuant to Sections 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rate of wages in the locality for each craft or type of worker needed to execute the work. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Clerk to the Fresno County Board of Supervisors, and will be made available to any interested person on request. A copy of this wage scale may also be obtained at the following Web Site: *www.dir.ca.gov/dlsr.*

B. Pursuant to Section 1775 of the Labor Code of the State of California, nothing in this Article shall prevent the employment of properly registered apprentices upon public works. Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she is

employed, and shall be employed only at the work of the craft or trade to which he/she is registered.

C. Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at Section 3070), Division 3, of the Labor Code, are eligible to be employed on public works. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.

D. Fresno County is committed to increasing the availability of employment and training opportunities, with particular attention to the plight of those who are most economically disadvantaged. In an effort to advance that purpose, the County will require that the Contractor and each subcontractor employed on this Project shall use their best efforts to ensure that thirty-three percent (33%) of apprentice hours, as determined by California Labor Code Section 1777.5 for each contractor and subcontractor of any tier on this Project are performed by qualified participants in the state approved apprenticeship programs who also are current or former "Welfare-to-Work" participants in the CalWORKs program. Provided, that nothing contained in this Paragraph D shall be interpreted to relieve or in any way diminish the obligation of the Contractor and each subcontractor to comply fully with all applicable apprenticeship laws in accordance with the California Labor Code and the California Code of Regulations; and accordingly such requirements as are contractually imposed by this Paragraph D shall be in addition to such legally mandated requirements, and applicable only to the extend fully consistent therewith.

E. Incentives whereby the Contractor or Subcontractor receives partial reimbursement for the wages paid to apprentices who qualify may be available. The incentive program is administered by the County of Fresno, Department of Social Services. For questions regarding the incentive program, contact the Department of Social Services at (559) 230-4008.

2.56 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted, and this contract shall be read and enforced as though it were included, and if through mistake or otherwise any provision is not inserted or is not correctly inserted, upon application of either party the contract shall be amended to make the insertion or correction.

2.57 DRUG FREE WORKPLACE CERTIFICATION

A. The Contractor shall comply with Government Code Section 8355 in matters relating to providing a drug-free workplace.

B. The Contractor shall publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of controlled substance is prohibited and specifying actions to be taken against employees for violations, as required by Government Code Section 8355(a).

C. The Contractor shall establish a Drug-Free Awareness Program as required by Government Code 8355(b), to inform employees about all of the following:

1. The dangers of drug abuse in the workplace,

2. The Contractor's policy for maintaining a drug-free workplace,

3. Any available counseling, rehabilitation and employee assistance programs,

4. Penalties that may be imposed upon employees for drug abuse violations.

D. Provide as required by Government Code 8355(c), that everyone who provides work under the Agreement.

1. Will receive a copy of the company's drug-free policy statement, and

2. Will agree to abide by the terms of the Contractor's statement as a condition of employment on the contract.

END OF GENERAL CONDITIONS

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Type of Contract.
3. Use of premises.
4. Owner's occupancy requirements.
5. Work restrictions.
6. Specification formats and conventions.

B. Related Sections include the following:

1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Fresno County Crisis Residential Treatment Facility

1. Project Location: 496 N. Barton Ave.
   Fresno, CA 93702
2. Owner: County of Fresno Department of Public Works and Planning
   2200 Tulare Street, 8th Floor
   Fresno, CA 93721
   Stuart Seiden, Capital Projects Division Manager
3. User: Fresno County Department of Behavioral Health
   Contact Name: TBD

B. Architect:

Dyson Siegrist Janzen Architects, Inc.
1295 N. Wishon Avenue
Fresno, CA 93728
Robert C. Siegrist, AIA, CSI, CDT, Architect in Responsible Control
Arthur Dyson, AIA, Design Architect
Mayuko Russell, Project Manager

C. Owner's Building Commissioning Agent:

Tavis Weston, CPMP
Commissioning Specialist
Kitchell CEM
4719 Viewridge Ave., Suite 130
San Diego, CA 92123

D. Owner's Project Manager:

1. Roger Davidson AIA, Architect, Project Manager
County of Fresno, Public Works and Planning Dept., Capital Projects Division

E. Project Description:

1. The work of the project consists of a new wood frame residential building of approximately 11,700 square feet to be constructed on a site of approximately 1.2 acres on property owned by Fresno County in the City of Fresno used most recently as a parking lot. The site is to be improved with walks, curbs, parking modifications, and new landscaping. The project is adjacent to existing streets, walks, drives and trees that must be protected and remain open. Existing on-site underground utilities need to be removed, relocated and/or capped as indicated in the Contract Documents. New utility services need to be brought to the site from the adjacent public right-of-way as indicated in the Contract Documents (separate Encroachment Permit required). Offsite improvement and Project Fire Protection authority is City of Fresno, on-site improvements and building approval authority is County of Fresno. The project will include coordination with separate contractors, suppliers and installers involved with separate furniture and equipment packages and/or separate bid packages as described in the Bidding Requirements or provided separately by the County of Fresno. Contractor shall perform the contract within the time stipulated, including all of its component parts and everything required to be performed and to provide and furnish any and all of the labor, materials, tools, expendable equipment, and all applicable taxes, and all utility and transportation services necessary to perform the contract and complete, in a workmanlike manner, all of the work required for the Project in strict conformity with the Contract Documents.

2. Work of this Project shall include providing all labor, material equipment and services required to perform all on-site and off-site preparation and work, all selective demolition, all site and building preparation, and all construction work in strict accordance with the Drawings, Specifications and other Contract Documents.

3. It is the intent that totally finished and fully functioning facilities be turned over to the Owner at completion. A diligent attempt has been made to indicate the required work and interface with existing elements to accomplish this. However, the Contractors shall visit the site to establish all observable existing conditions and shall incorporate into their scope and bids all necessary work to provide a finished product of expert craftsmanship within the general intent of the work indicated on the Drawings. Where work is required for proper finish or system functionality but not specifically shown, patch and match to existing adjacent surfaces and conditions whether new or existing, as appropriate to complete the work as directed by the Architect.

4. Work Description: this project includes but is not limited to:
   a. Site grading and drainage, AC paving, concrete curbs, gutters and walks, concrete masonry fences and retaining walls, street construction and extension of utilities, landscape planting and irrigation, site signage and site lighting, etc.
   b. Concrete slab on grade, foundations.
   c. Structural steel, columns, beams, canopy structure and miscellaneous steel items.
   d. Wood stud framing, plywood sheathing, solid sawn and glue-laminated beams, wood I-joists, and various manufactured wood products.
   e. Custom wood and plastic laminated cabinets, and solid surface countertops.
   f. Prefinished metal standing seam roof and trim. Waterproof membrane at planters and retaining walls.
   g. Steel doors and frames, wood doors. Aluminum storefronts, entrances and automatic sliding doors with low-E tinted dual glazing. Aluminum framed windows.
   h. Exterior lath and plaster walls with paint finish. Interior wood framing and drywall assemblies for partitions, soffits and ceilings.
   i. Paint and wall coverings. Carpet flooring and carpet base. Ceramic tile flooring, base and wainscots. Painting and other miscellaneous finishes.
   j. Interior signage, fire extinguishers and cabinets, and toilet room accessories. Operable partitions and vertical louver blinds.
   k. Coordination, preparation and utility connections for residential furnishings and equipment.
   l. Site and building plumbing systems including fixtures. Automatic fire sprinkler system, hybrid HVAC system with zoned air handlers and with ducted air distribution and direct digital control EMS.
   m. Site and building electrical systems including power, lighting, data, communications, security, and fire/smoke alarm. Final connection of equipment following installation of furniture and equipment.

1.03 TYPE OF CONTRACT

A. Perform the Work under a single fixed price general construction contract for Base Bid and all Owner accepted Alternate Bid Items. Alternate Bid Items may also be included to expand (or reduce) the scope of Work to encompass the entire construction budget. Alternate Bid Items are described in Division 1 Specification Section "Alternates," and/or as indicated in the drawings to include all incidental work required for a fully finished and functional facility.

1.04 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations as indicated on Drawings to encompass the required work that is designated for the project while allowing for other County activities and safe circulation to proceed in adjacent areas with minimal disruption.

B. Use of Site: Limit use of premises to specific work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated except as required for utilities and as authorized in advance by Owner. Use of the site for Contractor's point of access and lay-down areas for temporary placement / storage of field office, construction materials and equipment shall be limited to the areas in the drawings or as otherwise specifically authorized by Owner. Secure the perimeter with fencing in accordance with specifications section 01 50 00.

1. Owner Occupancy: Allow for Owner access to Project site and use by the Owner's Representatives.
2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

1.05 OWNER'S OCCUPANCY REQUIREMENTS

A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in partially completed areas of building, before Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
2. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

3. The Architect will issue a letter of recommendation of project acceptance to the County Project Manager and upon acceptance of the completed Project by the County of Fresno, a Notice of Completion will be issued to the Contractor and filed with the Fresno County Recorder.

1.06 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7 a.m. to 5 p.m., Monday through Friday, except otherwise indicated.

1. Weekend Hours: As arranged with the Owner.
2. Early Morning Hours: As arranged with the Owner, notice of noise activity must be provided 72 hours prior to start of work.
3. Hours for Utility Shutdowns: As arranged with Owner's Representative.

B. Existing Utility Interruptions: Do not interrupt utilities serving adjacent facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

1.07 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 2004 CSI/CSC's "Master Format" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications and are hereby incorporated with or without further reference.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural,

and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
   a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 CHANGES

A. All changes from the approved drawing shall be covered by Construction Change Documents and shall be approved by Architect, Owner and the Agency having jurisdiction (AHJ). Refer to Specification Section "Contract Modification Procedures."

B. Nothing in the drawings and specifications shall be construed to permit work not conforming to these codes.

3.02 INSPECTION, OBSERVATION AND BUILDING COMMISSIONING SERVICES

A. Inspections shall be provided by Fresno County Development Services.

B. Observation shall be provided by the Architect and County Project Manager.

C. Building Commissioning shall be provided by the Owner's Building Commissioning Agent.

3.03 CODE REFERENCE AVAILABILITY

A. Reference copies of the California Building Code, and the California Code of Regulations, Title 24, Parts 1 through 5 and Part 9, shall be kept on the job site at all times.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.
   1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:
   1. Lump-sum allowances.

C. Related Sections include the following:
   1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
   2. Division 1 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.02 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.03 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

A. TBD

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contractor Documents.
   1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Su.
   2. The cost or credit of each alternate shall include all amounts for profit, overhead and all other indirect costs attributable to the alternate.

B. Base Bid: All work shown on the drawings and called for in the specifications and details EXCLUDING all work called for on any Additive Alternate Bids.

1.03 ADDITIVE ALTERNATE BIDS

A. Should the Owner decide to add portions of work within 30 days following date of Notice to Proceed, at Owner's sole option (including all material, labor, equipment and services necessary to do this portion of work as shown on the Drawings and called for in the Specifications), add this portion of the work to the project.

1.04 ADDITIVE ALTERNATE BIDS DESCRIBED

A. <u>Additive Alternate 1 – Labyrinth</u>
   1. Provide concrete slab and painted lines as indicated on drawings. For Base Bid, provide top soil (for garden) and perimeter 2" x 4" pressure treated edge board.

B. <u>Additive Alternative 2 – Pavilion Structures</u>
   1. Provide backyard Pavilion canopy structure including footings, reinforced slab, steel framing, metal roofing and the CMU screen wall. For Base Bid, provide 3 ½" thick 2,500 PSI unreinforced concrete patio slab over compacted earth, same size as for Pavilion slab.

C. Additive Alternate 3 – Wood Framed Glass Partition

1. Provide NanaWall wood framed operable glass partition system as indicated in drawings between Exercise Room No. 22 and Reading Room No. 23 including head track, recessed floor track end wall jambs, hardware, all accessories and installation. For base bid, provide exposed structural support beam above floor slab recess for floor track (with temporary filler) and finish the rough opening with gypsum board (paint).

2. Provide frameless glass, as indicated in drawings, in the triangular shaped opening above the exposed structural support beam over the operable partition. For base bid, finish rough opening (except beam) with gypsum board (paint).

D. Additive Alternate 4 – Wood Acoustic Panels

1. Provide the wood acoustic panel system in ceiling over sitting room 3 and dining room 4 as indicated in drawings including supporting metal hat channels, rigid insulation, trim and accessories. For Base Bid, finish opening with gypsum board to match adjacent ceiling finish.

1.05 DEDUCTIVE ALTERNATE BIDS

A. Should the Owner decide to delete portions of work (including all material, labor equipment and services necessary to do this portion of work as shown in the Drawings and called for in the Specifications), delete this portion of the work from the project.

1.06 DEDUCTIVE ALTERNATE BIDS DESCRIBED

NONE

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 GENERAL

A. Provide LUMP SUM PRICE for construction of the Base Bid and each of the Additive Alternate Bids in their respective location on the Bid Form. Additive Alternate Bid amount shall include Contractors overhead, profit, bond and taxes.

B. Referenced sections of Specifications stipulate pertinent requirements for products and methods to achieve the work stipulated under each alternate.

C. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each alternate and to provide the complete construction required by Contract Documents.

3.02 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate. Include costs related to coordination, modification or adjustment.
   2. H.V.A.C. systems) as required for the work of the alternate to be complete and in working order, whether or not indicated, unless specifically indicated otherwise.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

E. Cost for Alternates: Indicate on the Bid Form the net amount to be added to or deducted from the Base Bid amount for each Alternate Bid Item described in the Schedule of Alternates. Provide a subtotal amount for each Alternate. Record amounts in space provided on Bid Form.

F. Additive Alternate Bids: Should the Owner decide to add portions of the Work (including all material, labor, equipment, services, and miscellaneous related costs necessary to do the portion of work as shown on the Drawings, called for in the Specifications and described below) add this portion of the Work to the Project. Add to, delete or replace portions of the Base Bid Work as indicated or required to provide the alternate work. Alternates may have multiple items, the sum of which make up the total work and cost for that Alternate.

END OF SECTION

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SECTION 01 25 00

SUBSTITUTION PROCEEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for handling requests for substitutions.

B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 01 33 00 "Submittals."

C. Procedural requirements governing the Contractor's selection of products and product options are included under the General Conditions.

1.03 DEFINITIONS

A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents are considered requests for "substitutions." The following are not considered substitutions:
1. Revisions to Contract Documents requested by the Owner or Architect.
2. Specified options of products and construction methods included in Contract Documents.
3. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.04 SUBMITTALS

A. Substitution Request Submittal: Requests for substitution will be considered if received no later than 14 days before bid closing. Requests received by the Construction Manager after this date will not be considered.

B. Submit a minimum of eight (8) copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals Section 01 26 00 – "Contract Modification Procedures", accompanied with the fully completed and signed Substitution Request Form included at the end of this Section.

C. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

1. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
2. Samples where applicable or requested.
3. A detailed, side-by-side comparison of the significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include but is not necessarily limited to elements such as size, weight, durability, performance and visual effect.
4. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors will become necessary to accommodate the proposed substitution.
5. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
6. Cost information, including a proposal of the net change, if any, in the Contract Sum.
7. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
8. The contractor warrants that he/she has investigated the proposed product and determined that it is equal to or superior in all respects to that indicated or specified.
9. The Contractor waives claim for additional costs and time associated with the proposed product, which may subsequently become apparent.
10. The Contractor shall provide a signed statement that the proposed product is in full compliance with the Contract Documents, and applicable regulatory requirements, requires no changes to specified controls and monitoring systems that may be specified in other Sections, and Certify that the contractor will be responsible for coordination at no additional cost to the Owner
11. The Contractor shall provide information on availability of maintenance service, and source of replacement materials, and provide a sample of Manufacturer’s standard form of guarantee or warranty for proposed product.

1.05 CONSTRUCTION MANAGER’S ACTION

A. Within one (1) week of receipt of the request for substitution, the Construction Manager will request additional information or documentation necessary for evaluation of the request. Within ten (10) days of receipt of the request, or

one (1) week of receipt of the additional information or documentation, whichever is later, the Construction Manager will notify the Contractor of acceptance or rejection of the proposed substitution. The Architect at his/her sole discretion will determine the acceptability of proposed products and his/her determination shall be final. If a decision on use of a proposed substitution cannot be made or obtained within the time allocated, use the product specified by name in the Contract Documents.

B. No consideration will be given to a substitute product unless, in the Architect's judgment, it complies with the following conditions.
   1. Substitution Request is complete.
   2. It is equal in quality, performance and serviceability.
   3. Its use does not entail changes in details or related construction.
   4. It is acceptable in regards to design and aesthetic effect.
   5. There is cost, time or both, advantage to the Owner.

C. Acceptance of a product shall not relieve the contractor from responsibility for the proper execution of the Work and any other requirements of the Contract Documents.

D. If a proposed product is not accepted, use the product originally specified or indicated in the Contract Documents.

E. No products other than those indicated or specified in the Contract Documents shall be purchased or incorporated in the Work without the Architect's prior written acceptance.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Conditions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
   1. Extensive revisions to Contract Documents are not required.
   2. Proposed changes are in keeping with the general intent of the Contract Documents.
   3. The request is timely, fully documented and properly submitted.
   4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
   5. The Specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
   6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or Separate Contractors, and similar considerations.
8. The specified product or method of construction cannot be provided in a manner which is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

B. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents, does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (not used)

END OF SECTION

Attachment (1 sheet): Substitution Request Form

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

B. Refer to General Conditions for additional provisions regarding changes in the Work. If any provision in this Section should conflict with any provision in the General Conditions, this Section shall control.

1.02 NO CHANGES WITHOUT CONSENT; PERFORMING WORK ORDERED

A. No extra work shall be performed, and no change shall be made, except pursuant to a written Change Order, Work Authorization, or Field Order from the Owner stating that the extra work or change is authorized, and no claim for any addition to the Contract Price or Time for Completion shall be valid unless ordered. However, nothing in this Section shall excuse the Contractor from diligently proceeding and fully completing the Project.

1.03 PROPOSAL REQUESTS; PROCEDURES

A. Proposal Requests Authorized. Subject to legal requirements relating to competitive bidding, the Owner may require changes in, additions to, or deletions from the scope of the Work to be performed or the materials to be furnished pursuant to the Contract Documents.
   1. The Owner may, at any time, without notice to the sureties, by written order designated or indicated to be a Change Order, make any change or modification in the Work, or add to the Work within the general scope of the Contract, including, but not limited to changes:
      a. In the Specifications or Drawings;
      b. In the sequence, method or manner of performance of the Work;
      c. In the Owner-furnished facilities, equipment, materials, service, or site.
   2. Owner Directed Changes Requiring an Increase in Contract Sum. If the Change in or addition to the Work will result in an increase in the Contract Sum, the Owner shall have the right to require the performance thereof on a Lump Sum basis or a Time and Material basis, all as hereinafter more particularly described. The right of the Owner as aforesaid shall apply with respect to each Change in the Work.

B. Methods of Calculation. Adjustments, if any, to the Contract Price by reason of any such change, addition or deletion, shall be determined by one (1) or more of the following methods, at the Owner's sole discretion. The Contractor shall provide sufficient substantiating data to allow the Owner to evaluate the Contractor's Proposal Request.

1. By a lump sum proposal by the Contractor accepted or amended by formal action by the Owner; and/or
2. By time and materials charges, limited to the "Actual Cost" to perform the Work, as defined herein, plus overhead and profit as defined in this Section.

C. Overhead/Profit and Allowable Time Limitations on Proposal Requests. If the Owner elects to have the Change in the Work performed on a Lump Sum basis, its election shall be based on a lump sum proposal which shall be submitted by the Contractor to the Construction Manager within ten (10) days of the Contractor's receipt of a request therefor, and the Owner reserves the right to request the Contractor to adjust the price of the proposed change order if the Owner disagrees with the Contractor's quoted price. The Owner's request for a lump sum proposal shall not be deemed an election by the Owner to have the change in the Work performed on a lump sum basis. The Contractor's and the Contractor's subcontractor's (all tiers) proposal shall be itemized and segregated by labor and materials for the various components of the change in, or addition to, the Work (no aggregate labor total will be acceptable) and shall be accompanied by signed proposals of any subcontractors who will perform any portion of the change in, or addition to, the Work and of any persons who will furnish materials or equipment for incorporation therein. The proposal shall also include the Contractor's estimate of the time required to perform said changes or additional work.

D. Labor Limitations. The portion of the proposal relating to labor, whether by the Contractor's forces or the forces of any of its subcontractors, may include reasonable anticipated costs of job site labor, including foremen, who will be directly involved in the change in the Work, for such time as they will be so involved. The Contractor's cost for Construction Managers, Project Engineers, Superintendents, Clerical, and like personnel are considered as contained in overhead.

E. Proposal Request Document Requirements. The Contractor's proposal for additional work shall include by itemized breakdown for work to be done by Contractor's own forces and including subcontractors with lower tier subcontractors' itemized breakdowns:

1. Cost of labor, including: hourly base wages, Social Security taxes, Federal or State unemployment taxes, workers' compensation insurance, and fringe benefits required by collective bargaining agreements effective for the Contractor and subcontractor(s).

2. Cost of materials and equipment or furnishings which will be incorporated into the permanent Work, including manufacturer's or supplier's cost, sales taxes, and cost of delivery.
3. Construction equipment costs (not small tools) for time of use required at Contractor's or subcontractor's unit rates or at discounted local published rates, whichever are less.
4. General Conditions, General Requirements, supervision, overhead (excluding small tools) and profit applied to the cost of labor, materials and equipment as defined above for:
    a. Work done by Contractor's own forces, not including bond and insurance premiums, fifteen percent (15%);
    b. Work done by subcontractors, all tiers, including bond and insurance premiums, if any, shall not exceed a cumulative total of fifteen percent (15%);
    c. General Conditions, General Requirements, Supervision, Overhead and Profit for Contractor on Subcontractor's work, five percent (5%);
    d. Under no circumstance will the sum total allowable mark up for General Conditions, General Requirements, supervision, overhead (excluding small tools) and profit, exceed a cumulative total of twenty percent (20%), including markups for all parties involved in a change.
5. Contractor's Performance and Payment Bond premiums, one-and-a-half percent (1.5 %).

F. In the event that the Contractor fails to submit his/her proposal within the designated period, the Owner may order the Contractor to proceed with the Change or Addition to the Work and the Contractor shall so proceed. The Owner shall unilaterally determine the reasonable cost and time to perform the work in question, which determination shall be final and binding upon the Contractor. In no event shall the Contractor allow an unresolved change in the Work to hamper the progress of the Work.

G. In the event that the parties are unable to agree as to the reasonable cost and time to perform the change in, or addition to, the Work based upon the Contractor's Proposal, and the Owner does not elect to have the Change in the Work performed on a Time and Materials basis, the Owner shall make a unilateral determination of the reasonable cost and time to perform the change in the Work, based on its own estimates, the Contractor's submission, or a combination thereof. A Change Order shall be issued for the amounts of cost and time determined by the Owner and shall become binding upon the Contractor unless the Contractor submits his/her protest in writing to the Owner within thirty (30) days of the issuance of the Change Order. Owner has the right to direct in writing the Contractor to perform the change in the Work, which is the subject of such Change Order. Failure of the parties to reach agreement regarding the cost and time of performing the change in the Work and/or any pending protest, shall not relieve the Contractor from performing the change in the Work promptly and expeditiously.

H. If the Owner elects to have the change in the Work performed on a Time and Materials basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its subcontractor or lower tier subcontractors, at actual cost to entity performing the change in Work, without any charge for administration, clerical expense, supervision, or superintendence of any nature whatsoever, or the cost, use or rental of tools or plant. The cost of a Change Order on a Time and Materials basis shall be evaluated according to the limitations defined in this Section. The Contractor shall submit to the Owner daily Time and Material tickets, to include the identification number assigned to the change in work, the location and description of the change in the Work, the classification of labor employed with names and Social Security numbers, the materials used, the equipment rented (not tools) and such other evidence of cost as the Owner may require. The Owner may require authentication of all Time and Material tickets and invoices by persons designated by the Owner for such purpose. The failure of the Contractor to secure any required authentication shall, if the Owner elects to treat it as such, constitute a waiver by the Contractor of any claim for the cost of that portion of the change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the Owner shall not constitute an acknowledgment by the Owner that the items thereof were reasonably required for the change in the Work.

I. No costs for General Conditions, General Requirements, supervision, overhead, and profit will be paid by the Owner on account of a change in the Work, except as specifically provided in this Section, and shall be deemed to include all costs and expenses which the Contractor or any of its subcontractors may incur in the performance of a change in the Work and which are not otherwise specifically recoverable by them as provided herein.

J. "Actual Costs" Defined. The actual cost to perform the Work for purposes of this Section is limited to the applicable labor rates set forth in these Specifications hereof, including Contractor's contributions directly attributable to the work authorized; and the material supplier's invoice amount for all material and equipment actually used to accomplish the work authorized. All other direct and indirect costs, all costs attributable to the time needed to perform the Work ordered by such Change Orders, and all profit associated with such work shall be included in the maximum overhead and profit amounts stated hereinabove.

K. Audit and Verification. With respect to any change in the Work resulting in a change in the Contract Sum, the Contractor shall afford and shall require its subcontractors to afford access to the Owner at all reasonable times to any books, correspondence, instructions, receipts, vouchers, memoranda, and records of any kind relating thereto, all of which shall be maintained by the appropriate parties for a period of at least three (3) years from and after the date the Owner makes payment on account of such change in work. The

Contractor authorizes the Owner and shall require its subcontractors to authorize the Owner to check directly with any suppliers of labor and material with respect to, and to obtain, sworn statements and waivers of lien.

L. Changes Requiring a Decrease in Contract Sum. If the change in the Work will result in a decrease in the Contract Sum, the Owner shall require a quotation by the Contractor of the amount of such decrease for use in preparing a Change Order. The Contractor's quotation shall be forwarded to the Owner within ten (10) days of the Construction Manager's request and, if acceptable to the Construction Manager, shall be incorporated in the Change Order. If not acceptable, the parties shall make every reasonable effort to agree as to the amount of such decrease, which may be based on a Lump Sum, properly itemized basis in accordance with this Section.

1. If the Construction Manager and the Contractor are unable to agree on the amount of such decrease, the decrease shall be the total estimated reduction in actual cost of the work, as determined by the Construction Manager in his/her reasonable judgment and the Contractor shall be bound to credit this amount to the Owner.

M. Periodic Change Orders. The Construction Manager is authorized to cumulate Proposal Requests and to process periodic Change Orders including additions and deletions, and to develop procedures providing the methods for such processing in addition to and consistent with those set forth herein.

1.04 WORK AUTHORIZATIONS; PROCEDURE:

A. Work Authorizations Authorized. The Owner or its designee is authorized to issue Work Authorizations instructing the Contractor to proceed with extra work.

B. Maximum Amounts. The Owner may approve a work authorization up to the limit as described in Public Contract Code Section 20142. The Owner may approve a time allocation for such work based upon the recommendation of the Construction Manager and Architect.

C. Quotation by Contractor. Other than in extraordinary circumstances, as described below, before a Work Authorization is issued, the Contractor shall submit a quotation setting forth an estimated cost of the Work to be performed with sufficient substantiating data to allow the Owner to evaluate the quotation, and an estimate of the time necessary to perform the Work. If requested by the Construction Manager, the Contractor shall provide additional data to support the quotation. The Contractor shall acknowledge the quotation as binding.

D. Request for Time Adjustment. If the Contractor claims that the Work Authorization has delayed the construction completion time, he shall verify the claimed delay by submitting a schedule fragnet and supporting

information demonstrating with reference to the approved Project Progress Schedule that the Work Authorization in fact caused a delay in the overall completion date of the Project. Upon such demonstration, the Construction Manager shall process a request for a Contract Time extension Change Order pursuant to these Specifications.

E. Cumulation of Work Authorizations. At the Construction Manager's sole discretion, the Contractor's claims for Change Orders arising from several Work Authorizations may be cumulated into periodic Change Orders adjusting Contract Price, Time, or both, separately or in one Change Order.
   1. Such periodic Change Orders shall include deductions for Changes which constitute Deductive Change Orders as defined hereinabove, during the time period being considered in the periodic Change Order.

F. Immediate Work Authorizations. In the event extraordinary circumstances arise which require extra work to be authorized before a quotation is prepared by the Contractor, the Owner or its designee may issue an immediate Work Authorization without such quotation. Such Work Authorization shall include a maximum authorized sum over which no price adjustment will be authorized. The determination as to whether circumstances as described above exist is discretionary with the Owner. Such Work Authorizations otherwise shall be processed as specified in this Section.

1.05 FIELD ORDERS; PROCEDURES

A. Field Orders Authorized. The Owner may issue Field Orders instructing the Contractor to proceed with work differing from that shown in the Contract Documents, and which changes the Scope of the Work, by adding or deleting Work, by instructing Work to be located differently than shown on the Contract Drawings, or making other minor changes which the Owner determines are in the Owner's best interests.

B. No Price or Time Adjustment Authorized. Field Orders are not authorized to change the Contract Price or Time, or to bind the Owner to the payment of any sum to the Contractor.

C. No Cost Adjustments Required. If the change ordered in the Field Order will neither delete nor add costs to the Project, the Field Order shall so note. If the Contractor contends that extra work is required, Article 1.03 of this Section shall apply.

D. Cost Adjustments Required. If the change ordered in the Field Order will either delete or add costs to the Project, the Field Order shall instruct the Contractor to submit its quotation. Thereafter, either Article 1.02 or Article 1.03 of this Section, as specified by the Construction Manager, shall apply.

E. Proceeding Before Decision. If the Contractor proceeds with work noted on a Field Order without notifying the Construction Manager of its claims that the Work is extra work, the Contractor shall have waived its right to request an adjustment to the Contract Price and/or Time. Such notification must be made prior to commencing any of the Work noted on the Field Order.

1.06 EXTRA WORK REQUESTS; PROCEDURE

A. If the Contractor claims that any Clarification, Field Order, or other instruction issued by the Owner requires work beyond the Scope of the Agreement for Construction, the following provisions shall apply.

1. Notice to Construction Manager. Within ten (10) calendar days, the Contractor shall notify the Construction Manager of its request, and submit a quotation for the requested costs, pursuant to Article 1.03 of this Section. The Contractor shall submit additional information requested by the Construction Manager to decide the request.
2. Action by Construction Manager. The Construction Manager shall review the Contractor's submittals and either recommend for approval or deny Contractor's request. If the request is approved, the Construction Manager may process either a Change Order or Work Authorization, pursuant to this Section. If the request is denied, the Construction Manager shall so advise the Contractor. Thereafter, the Contractor shall proceed with the Work in issue. The Construction Manager shall issue his/her decision within twenty-one (21) days of receipt of a complete submittal from the Contractor. The Construction Manager shall recommend final action to the Owner and the Owner's decision shall be binding on the Contractor.
3. Time. If the request is approved, the time during which the request was being considered shall be included in the time allocation for the Work Authorization adjusting the request, and Article 1.03 of this Section shall apply thereto; if the request is adjusted by Change Order, any Time extension authorized thereby shall include the Time during which the request was pending. If the request is denied, no Time adjustment shall be authorized.
4. Effect of Proceeding. If the Contractor proceeds with the Work without notifying the Construction Manager pursuant to Article 1.06.A.1, or before a decision pursuant to Article 1.06.A.2, any claim for a Contract Price and/or Time adjustment shall be waived.
5. Scheduling. The Contractor is responsible to schedule the Work and submit extra-work requests so the time required for decision, as specified in Article 1.06.A.2, does not delay the Work in general.
6. Contractor Notice of Change. If the Contractor asserts that any event or occurrence has caused a change in, or addition to, the Work which change causes an increase or decrease in the Contractor's cost or the time required for the performance of any part of the Work under the contract, the Contractor shall, within ten (10) days of such event, give the Owner written notice as herein required.

Said notice shall include the instructions or circumstances that are the basis of the change and the Contractor's best estimate of the cost and time involved.

a. If the Contractor intends to assert a claim under this Section, he/she must, within ten (10) days after receipt of a written Change Order under Article 1.02 above or the furnishing of a written notice under Article 1.06 submit to the Construction Manager a written statement setting forth the specific nature and cost of such claim, unless this period is extended by the Construction Manager. The statement of claim hereunder may be included in the notice under Article 1.06 above. Failure to submit such written notice within the specified time frame shall be deemed a waiver of the claim.
   1. The statement of claim shall include all direct, indirect and impact costs associated with the change, as well as the Contractor's estimate of the schedule impact of the change, if any.

b. If the parties are unable to agree to the reasonable cost and time to perform the Change, or are unable to agree as to whether a change occurred, the Owner shall make a unilateral determination as described in Paragraph 1.03G, and the Contractor shall proceed in accordance therewith.

1.07 CHANGE ORDERS REGARDING TIME FOR COMPLETION

A. Any time extension authorized by the Owner pursuant to Article 2.38 of the General Conditions, herein shall be set forth in a Change Order.

1.08 CHANGE ORDERS DUE TO UNAVAILABLE MATERIALS

A. In the event that the Contractor demonstrates good cause for a delay in the Contract Time due to the unavailability of materials, and provides the necessary documentation substantiating said cause for delay, the Owner, in its sole discretion, may either grant a Contract Time extension, or utilize this Section.

B. In the event that the Work is unable to be completed due to unavailable materials, and if all other aspects of the Work have been completed, the Contractor may request to delete the portion of the Work not yet completed from the Agreement for Construction, thereby allowing a Notice of Completion to be filed on the Project. The Owner shall approve no such Change Order unless the Contractor's request is accompanied by an offer to perform the Work so deleted for a price not to exceed the value of the Work deleted by such Change Order, such work to be commenced upon delivery of the materials, and diligently prosecuted to completion.

C. In the event the Owner elects to accept the Contractor's offer, work done pursuant thereto shall not be construed as Work done on the Project. The application of this Section is limited as follows:

1. No Change Order shall be issued pursuant to this Section until the Contractor has submitted all documents required for final payment.
2. This Section shall apply only to Work, the completion of which is precluded due to unavailable materials.
3. Utilization of this Section lies solely within the discretion of the Owner, and such discretion hereby is delegated to the Construction Manager.

1.09 EFFECT OF CONTRACTOR'S ACCEPTANCE OF CHANGE ORDER

A. By accepting a Change Order, Contractor agrees to the changes, if any, in the Contract Price specified for each item and to the specified Extension of Time allowed, if any, for completion of the entire Work on account of such Change Order, and agrees to furnish all labor and materials and perform all Work necessary to complete all additional Work specified therein for the price adjustment and within the time specified therein. Contractor shall make no additional claim for adjustment to the Contract Price or Contract Time, nor for additional costs or damages, on account of the work referenced in such Change Order. A Change Order duly issued by the Owner and accepted by the Contractor shall constitute a complete accord and satisfaction as to the Work, Contract Price, and Contract Time changed thereby. Contractor shall defend and indemnify the Owner, its officers, employees, agents and consultants, if any Subcontractor asserts any claim against the Owner that contradicts, or is inconsistent with, a duly issued Change Order accepted by Contractor.

1.10 EFFECT ON SURETIES

A. All changes authorized by the Contract Documents may be made without notice to, or consent of, the sureties on the Performance and Payment bonds, and shall not reduce their liability on the bonds.

B. The Owner reserves the right to require additional Performance or Payment bonds to secure a Change Order. In this event, the Change Order shall be increased by the actual cost of the bond premium for the additional bond amounts if any.

1.11 GENERAL PROVISIONS RELATED TO CHANGES

A. The Contractor shall not be entitled to any amount for indirect costs, damages, or expenses of any nature, including, but not limited to, so-called "impact" or "cumulative" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the proposal is based and to

which the parties have agreed pursuant to the provisions of Section 01 26 00, and which the Contractor, its subcontractors or sub-subcontractors or any other person may incur as a result of delay, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable,

arising from the performance of any and all changes in the Work performed pursuant to this Section 01 26 00. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of his/her direct costs as compensable hereunder and an extension of the Contract Time, but solely in accordance with the provisions of the Contract Documents.

B. No claim by the Contractor hereunder shall be allowed if asserted after final payment under this Contract. No claim relating to or flowing from a particular changes to the work shall be allowed after execution of the Change Order relating to that change.

C. If any disputes should arise between the parties with respect to an increase or decrease in the Contract Sum or an expansion or contraction in the Contract Time as a result of a change in the Work, the Contractor shall not suspend performance of a change in the Work or the Work itself unless otherwise so ordered by the Owner in writing. The Owner shall, however, pay to the Contractor up to the Owner's reasonable estimated value of the change in the work, regardless of the dispute, if said change in the Work results in an increase in the Contract Amount; and the Owner shall have the right to decrease the Contract Amount up to the Owner's reasonable estimated value of the change in the Work, regardless of the dispute, if said change in the Work results in a decrease in the Contract Sum, and the Contractor shall be bound by the Owner's decision as to amount of payment or credit.

1.12 MINOR CHANGES IN THE WORK

A. The Architect, Owner and/or Construction Manager shall have authority to order minor changes in the Work not involving an adjustment in the Contract Amount or an extension of the Contract Time, and not inconsistent with the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

PART 2- PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

SECTION 01 26 13

REQUESTS FOR INTERPRETATION (RFI)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for Request for Information (RFI), including:
   1. Definitions
   2. Request for Information Procedure
   3. Request for Information Review System

1.03 DEFINITIONS

A. General: To prevent misunderstanding between the Owner and the Contractor over project procedures, the following definitions are provided:
   1. Drawing / Plan Clarification: An answer from the Owner, in response to an inquiry from the Contractor, intended to make some requirement(s) of the drawings or plans clearly understood. Drawing / plan clarifications may be sketches, drawings, or in narrative form and will NOT change any requirements of the drawings or plans. Responses to Contractor inquiries shall be outlined elsewhere in this section.
   2. Project Communications: Routine written communications between the Owner and the Contractor shall be in letter, field, memo or fax format. Such communications shall NOT be identified as Request for Information nor shall they substitute for any other written provisions of these contract documents.
   3. Requests for Information: A written request from the Contractor, to the Owner, seeking an interpretation or a clarification of some requirement of the contract documents (see specification section 00 62 15 for form). The Contractor shall clearly and concisely set forth the issue for which he seeks clarification or interpretation and why he believes a clarification is needed. Responses from the Owner will not change any requirements of the project documents. Responses to Contractor inquiries shall be outlined elsewhere in this section.
   4. Submittals: Refer to Section 013323, "Submittal Procedures".
   5. Construction Schedule Submittals: Refer to Section 013226, "Construction Progress Documentation".

1.04 REQUEST FOR INFORMATION PROCEDURE:

A. General: The following establishes the process and timing concerning RFI's and their responses:

1. In the event that the Contractor or Subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the Owner, the Contractor shall submit a Request for Information in writing to the Inspector of Record. The written request shall be clearly titled "REQUEST FOR INFORMATION," in capital letters. Requests for Information may only be submitted by the Prime Contractor. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Owner.
2. The Inspector of Record will review all Requests for Information to determine whether they are Requests for Information within the meaning of this term. If the Inspector of Record determines that the document is not a Request for Information, it will be returned to the Contractor, unreviewed as to content, for resubmittal in the proper manner.
3. Responses to Requests for Information shall be issued within five (5) working days of receipt of the request from the Contractor unless the Inspector of Record determines that a longer time is necessary to provide an adequate response. The Contractor shall not be entitled to any time extension due to the time it takes the Owner to respond to the request provided that the Inspector of Record responds within the five (5) working days set forth above.
4. Responses from the Inspector of Record will not change any requirement of the contract documents. In the event the Contractor believes that a response to a Request for Information will cause a change to the requirements of the contract documents, the Contractor shall immediately give written notice to the Owner stating that the Contractor considers the response to need to be included in a Change Order. Failure to give such written notice within ten days and prior to performance of the work addressed by the RFI shall waive the Contractor's right to seek additional time or cost under the Changes article found in the General Conditions.

1.05 REQUEST FOR INFORMATION REVIEW SYSTEM

A. General: All documents labeled as RFI will be reviewed by the Owner to determine whether or not the document meets the definition of an RFI, as stated previously. If the document submitted is an RFI, the document will be entered into the RFI Log and processed for a response.

B. If the document submitted is not an RFI, it will be returned to the Contractor immediately with a standard letter of transmittal stating the following:

"This document is not an RFI and therefore is being returned to you without a response. This document has not been entered into the project's RFI Log. For processing, resubmit document in the proper format as (indicate one):

Project Communications
Submittals
Substitution
Schedule Submittal

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION

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SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
   1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.

B. The Contractor's Construction Schedule requirements are included in Section 01 32 00, "Construction Progress Documentation"; and Submittal Schedule requirements are included in Section 01 33 00, "Submittals".

1.03 SCHEDULE OF VALUES

A. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule. See Section 01 32 00 "Construction Progress Documentation" for additional information.
   1. Within thirty (30) calendar days after the Award of Contract, the Contractor shall submit Schedule of Values for review by Construction Manager, allocating a dollar value for each activity on the Construction Schedule.

B. Format and Content: Use the Construction Schedule as a guide to establish the format for the Schedule of Values.
   1. Identification: Include the following identification on the Schedule of Values:
      a. Project name and location.
      b. Name of the Owner.
      c. Project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
      a. Generic name.

b. Related Specification Section.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that have affected value.
g. Dollar value.
h. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total one hundred (100) percent.

3. The Schedule of Values shall be a product of the CPM Schedule and provide sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. The following information shall be minimally illustrated in the Schedule of Values and be subject to approval by the Construction Manager.
   a. Dollar value for each activity will be cost including labor and materials. The dollar value of the General Conditions as well as Overhead and Profit shall be dispersed equally throughout the CPM Schedule activities.
   b. Make sum of activity costs equal the Contract Amount.
   c. Separate line items for General Conditions and may be required *by the Owner*.
4. Component amounts shall be rounded off to the nearest whole dollar, and the cumulative total thereof shall equal the Contract Amount.
5. All material storage will be the responsibility of the contractor.
6. The CPM Schedule shall be progressed in accordance with the General Requirements Section "Construction Progress Documentation" 01 32 00 and the schedule update shall be utilized as the basis for the Contractor's Application for Payment.

1.04 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as reviewed by the Owner, Construction Manager and Architect, and paid for by the Owner. See General Conditions for additional information regarding progress payments and final payment.
   1. The initial Application for Payment, the Application for Payment at time of Completion, and the final Application for Payment involve additional requirements as listed below.
   2. Contractor to submit cash flow analysis quarterly as required for reporting to Board of Corrections.

B. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G702 and Continuation Sheets G 703 as the form for Application for Payment.

D. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned without action.
   1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
   2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the Application.

E. Transmittal: Submit three (3) executed copies of each Application for Payment to the Construction Manager by means ensuring receipt within twenty-four (24) hours; one (1) copy shall be complete, including waivers of lien and similar attachments, when required.
   1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Construction Manager.

F. Waivers of Mechanics Lien and Stop Notice: With each Application for Payment, submit waivers of mechanics lien and stop notices from every entity who may lawfully be entitled to file a mechanics lien or stop notice arising out of the Contract, and related to the Work covered by the payment.
   1. Submit partial waivers on each item for the amount requested on each item.
   2. When an application shows completion of an item, submit final or full waivers.
   3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

G. Initial Application for Payment: Administrative actions and submittals that must precede the submittal of the first Application for Payment include the following:
   1. List of subcontractors, including names, addresses and contact persons.
   2. List of principal suppliers and fabricators.
   3. Schedule of Values.
   4. Contractor's Construction Schedule (preliminary if not final).
   5. Submittal Schedule (preliminary if not final).
   6. List of Contractor's staff assignments.
   7. List of Contractor's principal consultants.
   8. Copies of authorizations and licenses from governing authorities for performance of the Work.
   9. Initial survey and damage report.

H. Final Payment Application: Administrative actions and submittals which must precede submittal of the final payment Application for Payment include the following:

1. All pertinent permits and similar approvals such as Board of Corrections / State Fire Marshal / Division of Forestry, Department of Health and Environmental Services, SJVAPCD, and RWQCB sign-off.
2. Warranties (guarantees) and maintenance agreements.
3. Test/adjust/balance records.
4. Maintenance instructions.
5. Start-up performance reports.
6. Change-over information related to Owner's occupancy, use, operation and maintenance.
7. Final cleaning.
8. Extra materials.
9. Application for reduction of retainage, and consent of surety.
10. Completion of Project closeout requirements.
11. Completion of items specified in order to achieve Completion.
12. Assurance that unsettled claims will be settled.
13. Transmittal of required Project construction records to Owner.
14. Proof that taxes, fees and similar obligations have been paid.
15. Removal of temporary facilities and services.
16. Removal of surplus materials, rubbish and similar elements.
17. Ensure Owner's exclusive access.
18. Sign off sheets for waste water treatment tracking conducted by contractor.
19. Post Warranty Bond in the amount of ten (10%) percent of Final Contract Amount.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT & COORDINATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
   1. General project coordination procedures.
   2. Conservation.
   3. Coordination Drawings.
   4. Administrative and supervisory personnel.
   5. Project meetings.
   6. General installation provisions.
   7. Cleaning and protection.

1.03 Progress meetings, coordination meetings and pre-installation conferences are included in Section 01 31 19 – Project Meetings.

1.04 Requirements for the Contractor's construction schedule are included in Section 01 32 00 - Construction Progress Documentation.

1.05 COORDINATION

A. Coordination: Coordinate construction activities included under various sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

B. Each contractor shall coordinate his/her construction operations with those of other contractors and entities, including those performing work under other contracts, to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate his/her operations with operations included in different sections that depend on each other for proper installation, connection, and operation. Special attention is given to Section 01 11 00 – Summary of Work, regarding Contractor's use of premises and work to be performed under separate contracts.

C. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

D. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

E. Make adequate provisions to accommodate items scheduled for later installation.

F. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

G. Requirements for coordination drawings are included in Section 01 04 20 – Coordination Drawings.

1.06 ADMINISTRATIVE PROCEDURES

A. Coordinate scheduling and timing of required administrative procedures with other construction activities, including those of other contracts, to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.

B. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water and materials.

C. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.07 SUBMITTALS:

A. Staff Names: Within fifteen (15) days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the Project site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers, including home and

office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

B. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with the manufacturer's installation instructions and recommendations, to the extent that these instructions and recommendations are more explicit or more stringent than requirements contained in Contract Documents.

C. Verify characteristics of interrelated assemblies and equipment for compatibility. Coordinate Work having independent responsibilities for installation connection, or servicing access.

D. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

E. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

F. Visual Effects: Provide uniform joint width in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Construction Manager for final decision.

G. Recheck measurements and dimensions, before starting each installation.

H. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

I. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

J. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Construction Manager for final decision.

3.02 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration prior to Final Acceptance.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period.

D. Execute periodic cleaning to keep Work, Site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations. Leave the work "broom clean".

E. Provide onsite containers for collection of waste materials, debris and rubbish.

F. Remove waste materials, debris and rubbish from site periodically and as often as necessary to maintain an orderly construction site, and dispose of at legal disposal areas away from site.

G. Do not allow trash containers to overflow.

H. Clean interior spaces prior to start of finish painting and continue cleaning on as-needed basis until painting is finished.

I. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 PRECONSTRUCTION CONFERENCES

A. Prior to commencement of work, a pre-construction conference will be held to discuss procedures to be followed during the progress of the Work. The meeting will be scheduled after execution of the agreement and prior to commencement of work.

B. Location: To be determined by Construction Manager.

C. Attending shall be:
1. Construction Manager
2. Architect and his/her professional consultants, as needed
3. Contractor
4. Contractor's Superintendent
5. Major subcontractors
6. Owner Representatives
7. Others as appropriate

D. Agenda: Following is suggested agenda. Actual agenda will be prepared and distributed by Construction Manager prior to meeting:
1. Introductions
2. Distribution and discussion of:
   a. List of major subcontractors and suppliers
   b. Projected Construction Schedules
3. Critical work sequencing and reiteration of contract obligation toward meeting milestones.
4. Major equipment deliveries and priorities.
5. Project Coordination.
6. Designation of responsible personnel.
7. Procedures and processing of:
   a. Correspondence
   b. Submittals
   c. Field Orders and clarifications
   d. Proposal requests and quotations

e. Change Orders and Work Authorizations
f. Applications for Payment
g. Requests for Information

8. Procedures for maintaining Record Documents
9. Use of premises:
   a. Office, work and storage areas
   b. Owner requirements
10. Construction facilities
11. Temporary utilities
12. Security considerations
13. Housekeeping and clean-up procedures
14. Insurance requirements
15. Wage and hour compliance
16. Noise and dust control
17. Testing and Inspection
18. Survey control
19. Other Subjects as appropriate

1.03 PROGRESS MEETINGS

A. The Construction Manager will schedule and hold meetings weekly. Construction Manager will prepare Agenda for such meetings and distribute to the interested parties at the next successive meeting.

B. Location: Contractor's field office or other acceptable location. Time and location of the meeting will be determined during the Pre-construction Conference.

C. Attending shall be:
   1. Construction Manager
   2. Contractor
   3. Contractor's Superintendent
   4. Subcontractors, as appropriate to the Agenda
   5. Suppliers, as appropriate to the Agenda
   6. Owner, as needed
   7. User Department representatives as needed
   8. Architect, and his/her professional consultants as needed
   9. Others, as appropriate to the Agenda

D. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
   1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the

Contractor's Construction Schedule, whether on time or ahead or behind schedule.

a. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2. Review the present and future needs of each entity present, including such items as:
   a. Interface requirements
   b. Time
   c. Sequences
   d. Deliveries
   e. Off-site fabrication problems
   f. Access
   g. Site utilization
   h. Temporary facilities and services
   i. Hours of work
   j. Hazards and risks (Contractor's Responsibility)
   k. Housekeeping
   l. Quality and work standards
   m. Change Orders
   n. Documentation of information for payment requests
   o. RFI's
   p. Submittals
   q. Correction Notices
   r. Disputed items
3. Reporting: No later than each successive meeting, Construction Manager will distribute copies of minutes of the meeting to each party present. Included will be a brief summary, in narrative form, of progress since the previous meeting and report.
4. Schedule Updating: Contractor to revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

1.04 PROGRESS PAYMENT MEETINGS

A. Schedule and hold a billing meeting each month prior to submittal of Application for Payment. Billing meetings shall coincide with last of month progress meeting, whenever possible.

B. Location: Contractor's field office or other acceptable location.

C. Attending shall be:
   1. Construction Manager
   2. Architect, as needed

3. Contractor
4. Owner, as needed

D. Prepare an itemized draft of the months proposed billing for review with the Construction Manager, Architect and Owner at the billing meeting. Refer to Section 01290 – Payment Procedures, for further requirements.

E. Following review of the proposed billing, revise as required, prepare Application for Payment, and submit to the Construction Manager. The Construction Manager will certify and forward it to the Owner, who will authorize payment upon receipt of partial waivers of lien from the Contractor and all Subcontractors for previous payment.

1.05 PRE-INSTALLATION CONFERENCES

A. Contractor shall convene a pre-installation conference for items of work contained in each division of the specifications, each trade within the division, and each subcontractor within the division.
1. Contractor shall convene a pre-installation conference prior to commencing the Work of the section, trade or subcontractor.
2. Contractor shall require attendance of each subcontractor and each trade directly affecting or affected by the Work within the division.
3. Construction Manager, Architect and Owner may attend pre-installation conferences.
4. Contractor shall convene additional conferences when required by individual section of the specification.
5. Contractor shall prepare an agenda, preside over the conference, and record minutes, and distribute copies within two (2) days after the conference to participants, with three (3) copies to the Construction Manager.
6. At a minimum, Contractor shall review conditions of installation, coordination, preparation, approved submittals, contract documents, schedule, testing and inspection, and means and methods planned to be used to perform the work.
7. Within forty-five (45) days after Notice to Proceed, submit a proposed list of pre-installation conferences, the approximate dates of the conferences, and items of work to be covered, for approval by the Construction Manager. Provide the Construction Manager with the actual date, time, and location of each conference at least one (1) week in advance of each conference.

1.06 GUARANTEE/WARRANTIES, BONDS, AND SERVICE AND MAINTENANCE CONTRACTS REVIEW MEETING

A. Eleven (11) months following date of Notice of Completion, hold a meeting for the purpose of review of guarantees/warranties, bonds, and service and

maintenance contracts for materials and equipment. Take action as appropriate to implement repair or replacement of defective items, and to extend service and maintenance contracts.

B. Attending shall be:
   1. Construction Manager
   2. Architect
   3. Owner's and Architect's Consultants, as appropriate
   4. Contractor
   5. Subcontractors, as appropriate to the Agenda
   6. Suppliers, as appropriate to the Agenda
   7. Others, as appropriate to the Agenda
   8. Owner

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used**)**

END OF SECTION

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SECTION 01 32 26

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Construction Schedule
   2. Construction photographs.

B. Related Sections include the following:
   1. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
   2. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
   3. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.
   4. Division 1 Section "Project Closeout" for submitting Project Record Documents at Project closeout.

1.03 SUBMITTALS

A. Contractor's Construction Schedule: Submit three printed copies of initial schedule, large enough to show entire schedule for entire construction period.

B. Construction Photographs: Submit three prints of each photographic view within fourteen days of taking photographs.

   1. Format: 5-by-7-inch smooth-surface matte prints on single-weight commercial-grade stock, punched for standard 3-ring binder.
   2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
      a. Name of Project.
      b. Name and address of photographer.
      c. Name of Contractor.
      d. Date photograph was taken.
      e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

C. Special Reports: Submit three copies at time of unusual event.

1.04 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, submittals schedule, progress reports, payment requests, and other required schedules and reports.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for Notice to Proceed to date of Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Inspector of Record.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing construction
   b. Limitations of continued occupancies
   c. Uninterruptible services
   d. Use of premises restrictions
   e. Environmental control

2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards
b. Submittals
c. Purchases
d. Installation
e. Tests and inspections
f. Adjusting
g. Curing

3. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following where applicable:
   a. Asbestos abatement
   b. Building demolition
   c. New construction
   d. Substantial completion

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Asbestos Abatement Clearance, Demolition Complete, Substantial Completion, and Final Completion.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

2.02 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.03 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
   1. List of subcontractors at Project site
   2. Approximate count of personnel at Project site
   3. Accidents
   4. Meetings and significant decisions
   5. Unusual events (refer to special reports)
   6. Stoppages, delays, shortages, and losses
   7. Emergency procedures
   8. Orders and requests of authorities having jurisdiction

9. Change Orders received and implemented
10. Construction Change Directives received
11. Services connected and disconnected
12. Substantial Completions authorized

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.04 SPECIAL REPORTS

A. General: Submit special reports directly to Inspector of Record within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Inspector of Record in advance when these events are known or predictable.

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE:

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to the Architect, Inspector of Record, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 01 33 23

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Mill Certificates, Samples, and other miscellaneous submittals.

B. Related Sections include the following:
1. Division 1 Section "Project Management and Coordination" for submitting Coordination Drawings.
2. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and construction photographs.
3. Division 1 Section "Quality Requirements" for submitting test and inspection reports.
4. Division 1 Section "Project Closeout" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.03 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.04 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities and identifiy on project construction schedule the expected submittal dates and submittal return date.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on the Architect's receipt of submittal.

1. Initial Review: Allow ten working days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow 20 working days for initial review of each submittal. It is the Contractor's responsibility to track his submittals and notify the Inspector of Record of submittals not returned to the Contractor within the time specified herein.
3. Allow 10 working days for processing each resubmittal.
4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing. The Contractor, in preparing his work schedule, shall allocate time for at least one resubmittal for each submitted item.

D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect (approximately 3" by 3" for Architects approval markings).
3. Include the following information on label for processing and recording action taken:
   a. Project name
   b. Date
   c. Name and address of Owner
   d. Name and address of Contractor
   e. Name and address of subcontractor
   f. Name and address of supplier
   g. Name of manufacturer
   h. Unique identifier, including revision number
   i. Number and title of appropriate Specification Section
   j. Drawing number and detail references, as appropriate

E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. On each submittal include Contractor's certification stating that information submitted has been reviewed, complies with requirements of the Contract Documents, and has been coordinated with other related portions of the Work.

3. Transmittal Form: Provide locations on form for the following information:
   a. Project name
   b. Date
   c. Destination (To:)
   d. Source (From:)
   e. Names of subcontractor, manufacturer, and supplier
   f. Category and type of submittal
   g. Submittal purpose and description
   h. Submittal and transmittal distribution record
   i. Remarks
   j. Signature of transmitter

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.01 ACTION SUBMITTALS

A General: Prepare and submit Action Submittals required by individual Specification Sections.
1. Number of Copies: Submit six copies of each submittal, unless otherwise indicated. Architect through Inspector of Record will return two copies. Mark up and retain one returned copy as a Project Record Document. Submit one additional copy for operation and maintenance manuals as required by other sections of these specifications.
2. Provide electronic PDF format copies distributed via email as authorized and directed by Owner and Architect.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's written recommendations
   b. Manufacturer's product specifications
   c. Manufacturer's installation instructions
   d. Standard color charts
   e. Manufacturer's catalog cuts
   f. Wiring diagrams showing factory-installed wiring
   g. Printed performance curves
   h. Operational range diagrams
   i. Mill reports

j. Standard product operating and maintenance manuals
k. Compliance with recognized trade association standards
l. Compliance with recognized testing agency standards
m. Application of testing agency labels and seals
n. Notation of coordination requirements

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
a. Dimensions
b. Identification of products
c. Fabrication and installation drawings
d. Roughing-in and setting diagrams
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
f. Shop work manufacturing instructions
g. Templates and patterns
h. Schedules
i. Design calculations and supporting information
j. Compliance with specified standards
k. Notation of coordination requirements
l. Notation of dimensions established by field measurement
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (750 by 1000 mm).
3. Number of Copies: Submit copies of each submittal, as follows:
a. Initial Submittal: Submit six prints. Architect through Inspector of Record will return two prints. Submit one additional print for operation and maintenance manuals as required by other sections of these specifications.
b. Electronic PDF format copies distributed via email as authorized and directed by Owner and Architect.

D. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
a. Generic description of Sample
b. Product name or name of manufacturer
c. Sample source
3. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
a. Size limitations
b. Compliance with recognized standards
c. Availability
d. Delivery time

4. Number of Samples for Initial Selection: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect through Construction Inspector will return submittal with options selected.

E. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.

F. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

2.02 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will not return copies. Provide electronic PDF format copies distributed via email as authorized and direct by Owner and Architect.
2. Certificates and Certifications: Provide a notarized statement that includes signature of Contractor, testing agency, or design professional responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of the company.
3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

G. Mill Certificates: provide testing data regarding the fabrication and strength of metal products. Mill Certificates shall be less than 1 year old.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

J. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization
2. Date of evaluation
3. Time period when report is in effect
4. Product and manufacturers' names
5. Description of product
6. Test procedures and results
7. Limitations of use

M. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

N. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates
2. Required substrate tolerances
3. Sequence of installation or erection
4. Required installation tolerances
5. Required adjustments
6. Recommendations for cleaning and protection

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, coordinated and approved for compliance with the Contract Documents.

3.02 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows (or similar terminology):
   1. A ACTION: Fabrication manufacture, and or construction may proceed providing the work is in compliance with the Contract Documents. The Contractor may proceed with this work.
   2. B ACTION: Fabrication manufacture, and or construction may proceed providing the work is in compliance with the Architect's (or his consulting Engineers) notations and the Contract Documents. The Contractor may proceed with this work.
   3. C ACTION: No work shall be fabricated, manufactured, or constructed. Revise and resubmit. No submittal marked C ACTION is permitted on the site. The Contractor may not proceed with this work.

C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect and Inspector of Record will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

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SECTION 01 42 13

GENERAL ABBREVIATIONS

1.01 GENERAL

Interpret abbreviations used on the drawings and in the specifications as tabulated below. If an abbreviation on a drawing is not explained below, it shall be as explained in ANSI Y1.1. The interpretation of abbreviations shall consider the context or discipline in which they are used, for example:

A. FF usually means "finish floor" when referring to a floor slab.

B. FF usually means "flat face" when referring to a pipe flange.

1.02 LIST OF GENERAL ABBREVIATIONS

Abbreviation	Term
A	
A	Ampere/Area
AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturer's Association
AAS	Airport Advisory Service
AASHTO	American Association of State Highway and Transportation Officials
AB	Anchor Bolt/Aggregate Base
ABAN	Abandoned
ABC	Asphalt Base Course
ABT	About
AC	Acre/Asphaltic Concrete/Alternating Current/Air Conditioning
ACCU	Air Cooled Condensing Unit
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
ACP	Asbestos-Cement Pipe
ACU	Air Conditioning Unit
AD	Access Door
ADDL	Additional
AE	Architect-Engineer
AF	Air Filter/Ampere Frame
AFB	Air Force Base
AFBMA	Anti-Friction Bearing Manufacturer's Association
AGA	American Gas Association

Abbreviation	Term
AGMA	American Gear Manufacturer's Association
AHD	Ahead
AHU	Air Handling Unit
AI	The Asphalt Institute
AIA	American Institute of Architects
AICS	Amperes Interrrupting Capacity, Symmetrical
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AL	Aluminum
ALIGN	Alignment
ALM	Alarm
ALTN	Alternate
AMB	Ambient
AMCA	Air Movement and Control Association
AMP	Ampere
ANCH	Anchor
ANG	Angle
ANSI	American National Standards Institute
API	American Petroleum Institute
APPROX	Approximate
APWA	American Public Works Association
ARCH	Architecture/Architectural
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ARV	Air-Release Valve
ARVV	Air-Release/Vacuum Valve
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPH	Asphalt
ASSY	Assembly
ASTM	American Society of Testing and Materials
ATS	Automatic Transfer Switch
AVE	Avenue
AVG	Average
AWG	American Wire Gauge

Abbreviation	Term
AWPA	American Wood Preservers Association
AWPB	American Wood Preservers Bureau
AWS	American Welding Society
AWWA	American Water Works Association
B	
BB	Back-to-Back
BC	Beginning of Curve/Back of Curve/Bolt Circle
BCR	Begin Curb Return
BEG	Begin
BETW	Between
BF	Blind Flange
BHP	Brake Horsepower
BK	Back/Brake
BKR	Breaker
BL	Base Line
BLDG	Building
BLK	Block
BM	Bench Mark/Beam
BO	Blowoff
BOCA	Building Officials Code Administration International, Inc.
BOD	Biochemical Oxygen Demand
BOT	Bottom
BP	Baseplate
BR	Bronze/Branch
BRG	Bearing
BTN	Button
BTU	British Thermal Unit
BUR CBL	Buried Cable
BV	Butterfly Valve
BVC	Begin Vertical Curve
BW	Block Wall
C	
C	Conduit/Celsius
CAB	Crushed Aggregate Base
CALTRANS	California Department of Transportation
CANTIL	Cantilevered
CAP	Capacity

Abbreviation	Term
CATV	Cable Television
CB	Catch Basin/Circuit Breaker
CC	Cooling Coil
C-C	Center-to-Center
CCB	Concrete Block
CCP	Concrete Cylinder Pipe
CCS	Central Control Station
CD	Cross Drain/Condensate Drain/Ceiling Diffuser
CEM	Cement
CF	Cubic Feet/Curb Face
CFH	Cubic Feet Per Hour
CFM	Cubic Feet Per Minute
CFS	Cubic Feet Per Second
CG	Ceiling Grill
C & G	Curb and Gutter
CH	Chiller
CHG	Change
CHKD PL	Checkered Plate
CI	Cast Iron
CIP	Cast in Place/Cast-Iron Pipe
CISP	Cast Iron Soil Pipe
CISPI	Cast-Iron Soil Pipe Institute
CJ	Construction Joint
CL	Centerline/Class/Clearance
CLR	Clear
CMAA	Crane Manufacturer's Association of America
CMC	Cement-Mortar Coated or Coating
CML	Cement-Mortar Lined or Lining
CMLCSP	Cement-Mortar Lined and Coated Steel Pipe
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CMU	Concrete Masonry Unit
CO	Cleanout/Conduit Only
COL	Column
COMM	Communication
COMP	Composite
COMPL	Complete

Abbreviation	Term
CONC	Concrete
CONN	Connection
CONST	Construct or Construction
CONT	Continuous
CONTR	Contractor
COORD	Coordinate/Coordinated
COP	Copper
COR	Corner
CPLG	Coupling
CPU	Central Processing Unit
CRES	Corrosion Resistant Steel
CRSI	Concrete Reinforcing Steel Institute
CS	Carbon Steel/Commercial Standard
CSP	Corrugated Steel Pipe
CT	Center Top/Current Transformer
CTG	Coating
CTR	Center
CTV	Cable Television
CULV	Culvert
CU YD, CY	Cubic Yard
CYL	Cylinder
D	
D	Degree of Curvature
DB	Direct Buried/Decibel
DBL	Double
DC	Direct Current
DEPT	Department
DET	Detail/Detour
DG	Decomposed Granite
DI	Drop Inlet/Ductile Iron
DIA	Diameter
DIAG	Diagonal
DIM	Dimension
DIMJ	Ductile-Iron Mechanical Joint
DIP	Ductile-Iron Pipe
DIPRA	Ductile-Iron Pipe Research Association
DISCH	Discharge

Abbreviation	Term
DIST	Distance
DIV	Divide/Division
DO	Dissolved Oxygen
DMH	Drop Manhole
DN	Down
DP	Differential Pressure
DPI	Differential Pressure Indicator
DPNL	Distribution Panel
DR	Drain/Door
DSL	Diesel
DWG	Drawing
DWY	Driveway
E	
E	East
EA	Each
EC	End of Curve
ECC	Eccentric
ECR	End of Curb Return
ED	External Distance
EDUC	Eductor
EE	Each End
EF	Each Face/Exhaust Fan
EFF	Efficiency
EFL	Effluent
EG	Exhaust Grill
EGL	Energy Grade Line
EL	Elevation/Each Layer
E/L	Easement Line
ELEC	Electric
ELEV	Elevation
ELP	Elliptical
EMB	Embankment
ENC	Encasement
ENCL	Enclosure
ENG	Engine
ENGR	Engineer
EOP	Edge of Pavement

Abbreviation	Term
EOS	Equivalent Opening Size
EOTW	Edge of Traveled Way
EP	Explosion Proof/Edge of Pavement
EPA	Environmental Protection Agency (Federal)
EQ	Equation
EQL	Equal
ESMT	Easement
EST	Estimate or Estimated
ETC	And so Forth
ETM	Elapsed Time Meter
EVAP	Evaporator
EVC	End Vertical Curve
EW	Each Way
EWC	Electric Water Cooler
EXC	Excavate or Excavation
EXP	Expansion
EXST	Existing
EXT	Exterior/Extension
F	
F	Fahrenheit/Floor
FAA	Federal Aviation Administration
FAB	Fabricate
FBRBD	Fiberboard
FC	Foot-Candle
FCC	Filter Control Console
FCO	Floor Cleanout
FCV	Flow Control Valve
FD	Floor Drain
FDN	Foundation
FE	Flanged End
FF	Finished Floor/Flat Face
FG	Finished Grade
FHY	Fire Hydrant
F&I	Furnish and Install
FIG	Figure
FIN	Final
FIT	Fitting

Abbreviation	Term
FL	Floor/Flow Line
FLEX	Flexible/Flexure
FLG	Flange
FLT	Float
FLUOR	Fluorescent
FM	Force Main/Factory Mutual
FMH	Flexible Metal Hose
FNSH	Finish
FOC	Face of Concrete
FOS	Face of Stud
FPC	Flexible Pipe Coupling
FPM	Feet Per Minute
FPS	Feet Per Second
FPT	Female Pipe Thread
FS	Finished Surface/Floor Sink/Federal Specifications
FSTNR	Fastener
FT	Feet or Foot
FTG	Footing
FUT	Future
FWY	Freeway
G	
G	Gas
GA	Gauge
GAL	Gallon
GALV	Galvanized
GAS	Gasoline
GB	Grade Break
GDR	Guard Rail
GE	Grooved End
GEN	Generator
GENL	General
GFI	Ground Fault Interrupter
GM	Gas Main
GMT	Greenwich Mean Time
GND	Ground
GPD	Gallons Per Day
GPM	Gallons Per Minute

Abbreviation	Term
GR	Grade
GRTG	Grating
GSKT	Gasket
GUT	Gutter
GV	Gate Valve
GWB	Gypsum Wallboard
GWBX	Gypsum Wallboard, Fire Rated
GYP	Gypsum
H	
H	Humidistat
HARN	Harness
HB	Hose Bibb
HC	Heating Coil
HD	Heavy Duty
HDPE	High Density Polyethylene
HEPA	High Efficiency Particulate Air
HGL	Hydraulic Grade Line
HGT	Height
HID	High Intensity Discharge
HOA	Hand-Off-Automatic
HOR	Hand-Off-Remote
HORIZ	Horizontal
HP	Horsepower/High Pressure
HPS	High Pressure Sodium
HPT	High Point
HR	Hour/Handrail
HS	High Strength
HTG	Heating
HTR	Heater
HV	Hose Valve
HVAC	Heating, Ventilating, and Air Conditioning
HVY	Heavy
HW	Headwall/Hot Water
HWL	High Water Level
HWY	Highway
HYDR	Hydraulic
HZ	Hertz (cycles per second)

Abbreviation	Term
I	
I	Intersection Angle
ICBO	International Conference of Building Officials
ID	Inside Diameter
IE	Invert Elevation
IEEE	Institute of Electrical and Electronics Engineers
IN	Inches
INCAND	Incandescent
INCL	Include
INL	Inlet
INS	Insulating
INSTL	Install or Installation
INTR	Interior/Intersection
INV	Invert
IP	Iron Pipe
IPS	Iron Pipe Size
IPT	Iron Pipe Thread
IRR	Irrigation
ISA	Instrument Society of America
J	
J	Joist
JB	Junction Box
JCT	Junction
JN	Join
JT	Joint
K	
KG	Kilogram
KM	Kilometer
KIPS	Thousands of Pounds
KV	Kilovolt
KVA	Kilovolt-Ampere
KW	Kilowatt
KWH	Kilowatt-Hour
KWHM	Kilowatt-Hour Meter
L	
L	Length of Curve/Long/Left
LATL	Lateral

Abbreviation	Term
LAV	Lavatory
LB	Pound
LBR	Lumber
LCL	Local
LF	Linear Foot
LG	Long
LI	Level Indicator
LLO	Long Leg Outstanding
LOC	Location/Locate
LOS	Lockout Stop
LP	Light Pole
LPT	Low Point
LR	Long Radius
LS	Lift Station
LT	Left/Light
LTG	Lighting
LWC	Lightweight Concrete
LWIC	Lightweight Insulating Concrete
LWL	Low Water Level
M	
MA	Milliampere
MAG	Magnet/Magnetic
MATL	Material
MAX	Maximum
MB	Machine Bolt/Megabyte/Millibars
MBH	Thousand BTU Per Hour
MECH	Mechanical
MC	Metal Channel
MCC	Motor Control Center
MCM	Thousand Circular Mils
MCP	Motor Circuit Protector
MD	Motorized Damper
MFR	Manufacturer
MG	Million Gallons/Milligram
MGD	Million Gallons Per Day
MH	Manhole
MHZ	Megahertz

Abbreviation	Term
MI	Malleable Iron/Mile
MIL	Military Specifications
MIN	Minimum
MISC	Miscellaneous
MLSS	Mixed Liquor Suspended Solids
MLVSS	Mixed Liquor Volatile Suspended Solids
MJ	Mechanical Joint
MMA	Monorail Manufacturer's Association
MO	Motor Operator/Motor Operated/Masonry Opening
MOD	Modification
MON	Monument
MOT	Motor
MPT	Male Pipe Thread
MSL	Mean Sea Level
MSS	Manufacturer's Standardization Society
MTD	Mounted
N	
N	North/Neutral/Nitrogen
NA	Not Applicable
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
N & C	Nail and Cap
NC	Normally Closed
NE	Northeast
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFC	National Fire Code
NIC	Not in Contract
NIP	Nipple
NO	Number/Normally Open
NOM	Nominal
NPT	National Pipe Taper
NPSH	Net Positive Suction Head
NRS	Nonrising Stem
NTS	Not to Scale
NW	Northwest
NWL	Normal Water Level

Abbreviation	Term
O	
OA	Overall/Outside Air
OC	On Center/Overcurrent
OD	Outside Diameter
ODP	Open Dripproof
OE	Or Equal
OF	Outside Face
OPER	Operator
OPNG	Opening
OPP	Opposite
ORIG	Original
OSA	Outside Air
OSHA	Occupational Safety and Health Administration
O TO O	Out to Out
OVFL	Overflow
OVHD	Overhead
P	
P	Pole
PARA	Paragraph
PB	Push Button/Pull Box
PC	Point of Curvature/Programmable Controller
PCA	Portland Cement Association
PCC	Point of Compound Curvature/Portland Cement Concrete
PDI	Plumbing and Drainage Institute
PE	Plain End/Polyethylene/Professional Engineer
PEN	Penetration
PERF	Perforated
PF	Power Factor
PG	Pressure Gauge
PI	Point of Intersection
PJTN	Projection
PKWY	Parkway
PL	Plate/Property Line
PLATF	Platform
PLF	Pounds Per Lineal Foot
PNL	Panel
POB	Point of Beginning

Abbreviation	Term
POC	Point of Connection
POJ	Push-On Joint
PP	Power Pole/Polypropylene
PPB	Parts Per Billion
PPM	Parts Per Million
PR	Pair
PRC	Point of Reverse Curve
PRESS	Pressure
PRL	Parallel
PROV	Provisions
PRPSD	Proposed
PRVC	Point of Reverse Vertical Curve
PSI	Pounds Per Square Inch
PSIG	Pounds Per Square Inch Gauge
PSF	Pounds Per Square Foot
PT	Point of Tangency
PV	Plug Valve
PVC	Polyvinyl Chloride
PVMT	Pavement
PWR	Power
Q	
Q	Flow Rate
QTY	Quantity
R	
R	Right/Radius
RAD	Radius/Radial
RAF	Return Air Fan
RAG	Return Air Grille
RC	Reinforced Concrete
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arch
RD	Road
RDC	Reduce
RDCR	Reducer
RDWY	Roadway
REF	Reference

Abbreviation	Term
REINF	Reinforce or Reinforced
RELOC	Relocated
REQ	Required/Requirement
REQD	Required
REV	Revise/Revision
RF	Raised Face
RH	Relative Humidity
RND	Round
RJ	Restrained Joint
RLG	Railing
RPM	Revolutions Per Minute
RR	Railroad
RST	Reinforcing Steel
RT	Right
RTD	Resistance Temperature Detector
R/W	Right-of-Way
S	
S	South/Slope in Feet Per Foot/Sewer
SAE	Society of Automotive Engineers
SAN	Sanitary
SAR	Supply Air Register
SBCCI	Southern Building Codes Congress International
SC	Seal Coat
SCFM	Standard Cubic Feet Per Minute
SCHED	Schedule
SCR	Silicon-Controlled Rectifier
SCRN	Screen
SD	Storm Drain
SDG	Siding
SDI	Steel Deck Institute
SDWK	Sidewalk
SE	Southeast
SECT	Section
SF	Square Feet
SGL	Single
SH	Sheet/Sheeting/Shielded
SIM	Similar

Abbreviation	Term
SLP	Slope
SLV	Sleeve
SM	Sheet Metal
SOL	Solenoid
SOV	Solenoid-Operated Valve
SP	Space/Steel Pipe/Static Pressure/Spare
SPCG	Spacing
SPEC	Specification
SPLC	Splice
SPRT	Support
SQ	Square
SQ FT	Square Feet
SR	Short Radius
SS	Sanitary Sewer
SSPC	Steel Structures Painting Council
SST	Stainless Steel
ST	Street
STA	Station
STBY	Standby
STD	Standard
STK	Stake
STL	Steel
STR	Straight
STRL	Structural
STRUCT	Structure
STS	Storm Sewer
STGR	Stringer
STWY	Stairway
SURF	Surface
SW	Southwest
SWG	Swing
SYMM	Symmetrical
SYS	System
T	
T	Ton/Tangent Length of Curve/Telephone
TAN	Tangent
T/B	Top of Beam

Abbreviation	Term
TB	Top of Bank/Terminal Board
T & B	Top and Bottom
TBG	Tubing
TBM	Temporary Bench Mark
TC	Top of Curb
TD	Time Delay
TDH	Total Dynamic Head
TDS	Total Dissolved Solids
TEFC	Totally Enclosed Fan Cooled
TEL	Telephone
TEMP	Temperature/Temporary
TENV	Totally Enclosed Nonventilated
THB	Thrust Block
THD	Thread or Threaded
THH	Thrust Harness
THK	Thick
TIR	Total Indicator Reading
TO	Turnout
T/O	Top of
TOC	Top of Concrete
TOS	Top of Slab
TOT	Total
TP	Telephone Pole
TRD	Tread
TRA	Tie Rod Assembly
TS	Tube Steel
TV	Television
TYP	Typical
U	
UBC	Uniform Building Code
UD	Underdrain
UG	Underground
UH	Unit Heater
UL	Underwriters' Laboratories, Inc.
ULT	Ultimate
UNO	Unless Noted Otherwise
UPS	Uninterruptible Power Supply

Abbreviation	Term
UR	Urinal
USGS	United States Geological Survey
UTC	Underground Telephone Cable
UTR	Up Through Roof
V	
V	Vent/Valve/Volt
VAC	Vacuum/Volts, Alternating Current
VC	Vertical Curve
VCP	Vitrified Clay Pipe
VEL	Velocity
VERT	Vertical
VFD	Variable Frequency Drive
VOL	Volume
VPC	Vertical Point of Curve
VPI	Vertical Point of Intersection
VPT	Vertical Point of Tangency
VSS	Volatile Suspended Solids
VTR	Vent Through Roof
W	
W	West/Watt/Wide/Water
W/	With
WC	Water Closet
WCO	Wall Cleanout
WG	Water Gauge
WH	Wall Hydrant
WL	Waterline
WLD	Welded
WM	Water Meter/Water Main
W/O	Without
WP	Waterproof/Working Point
WRGWB	Water-Resistant Gypsum Wallboard
WSE	Water Surface Elevation
WSP	Water Stop
WT	Weight
WTR	Water
WWF	Welded Wire Fabric
WWM	Woven Wire Mesh

Abbreviation	Term
X	
XFMR	Transformer
XFR	Transfer
Y	
YCO	Yard Cleanout
YD	Yard
YP	Yield Point
YR	Year
YS	Yield Strength
Z	

END OF SECTION

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SECTION 01 45 00

QUALITY CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for quality control services.

B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

E. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
   1. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
   2. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 RESPONSIBILITIES

A. Owner Responsibilities: The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.

1. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.
2. Any RETESTING will be performed by the testing firm under the direction of the Owner or the Architect. In accordance with paragraph "D" below, the costs for any such retesting will be paid by the Owner and DEDUCTED from the Contract Sum.
3. The Owner shall provide for continuous, adequate inspection by a project inspector, who shall be approved by the Architect and the Structural Engineer. No work shall be performed without the direct inspection by the Owner's Project Inspector of Record (IOR). The Owner shall provide for all Special Inspectors, in addition to the IOR, which are necessary for specific quality control requirements under Section 1.02 E. These inspectors hall be approved by the Architect and the Structural Engineer.

B. Duties of the Inspection and/or Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification sections shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
1. The Agency shall notify the Architect, Contractor & DSA promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.
4. Test and Inspection reports shall be issued by the Testing Agency directly to the Owner, the Architect, and the Structural Engineer. Reports for other non-structural testing as required by these specifications shall be forwarded to the Owner and the Architect.

C. Contractor Responsibilities: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.
    a. Retesting: The Contractor is responsible scheduling retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements.
    b. Cost of retesting construction revised or replaced by the Contractor will be paid for by the Owner and will be deducted from the Contract Sum in accordance with below.
    c. Contractor shall furnish labor, materials and equipment and perform all operations required to prepare for and take test samples a required for inspection of all work.

d. Whenever Contractor elects to work during hours other than normal work week and laboratory inspection is required, Owner will pay normal cost of laboratory inspection/testing and Contractor shall pay that portion of laboratory inspection cost due to overtime.

D. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
1. Providing safe access to the work and to any shops used in preparing products, and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
2. Assisting the IOR and/or Testing Agency in taking adequate quantities of representative samples of materials that require testing.
3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
5. Security and protection of samples and test equipment at the Project site.

E. Re-testing Costs: When initial tests indicate noncompliance with the Contract Documents, all subsequent re-testing occasioned by the noncompliance shall be performed by the same testing laboratory. The costs associated with these re-tests will be paid for by the Owner but deducted by the Owner from the Contract Sum.

1.04 SUBMITTALS

A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Architect in duplicate.
1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

1.05 QUALITY ASSURANCE

A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as follows:
1. Each independent inspection and testing agency engaged on the Project shall be authorized by the Architect and Structural Engineer and shall use laboratory facilities certified by the Division of the State Architect, Structural Safety Section.

B. Additional testing will be required as shown on the structural drawings.

C. Rejection of Materials: Any materials shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the project.

PART 2 - PRODUCTS

2.01 REPORTS

A. Testing lab shall copy all reports to the Architect, the Inspector, the Contractor and the Owner.

B. Material Testing Reports shall contain the following:
1. Include all tests made, whether materials are satisfactory or unsatisfactory.
2. Listing of samples taken but not tested.
3. Records of special sampling operations.
4. Statement that the materials sampled were tested in accordance with the requirements of Title 24 and the Specifications.
5. Specified design strength for the materials being tested.
6. A definitive statement as to whether the materials comply with the requirements.

C. Final Reports: The testing agency shall submit to the Ow3ner, Architect and Structural Engineer a report, in duplicate, covering all tests which are required to be made by the agency during the progress of the work. Said reports shall be filed at the completion of the project and also at each time the work of the project is suspended, covering all tests accomplished up to that time.

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample-taking and similar services, the Contractor shall repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies requirements for temporary facilities and controls, including utility, construction and support facilities, and security and protection. Furnish and install all required temporary facilities and controls as shown or specified herein plus such facilities as required for proper performance of the Contract. All such temporary facilities and controls shall be located where directed and re-located as required by the progress of the work and maintained in a safe and sanitary condition at all times until completion of the Contract.

B. Contractor shall be responsible for all of its own office and construction utilities including the cost of permits, usage, generation, installation, relocation, distribution, metering, maintenance, safety, disposal, and removal. Coordinate this work with the Construction Manager.

C. Coordinate installation and removal of temporary utilities with Construction Manager, utility companies, other contractors, and authorities having jurisdiction. Contractor shall submit plans to the Construction Manager for approval of proposed temporary utilities and facilities.

D. Do not install, or remove any temporary utility without prior written approval by Construction Manager. Construction Manager's written approval does not guarantee or warrant that utilities installed by the Contractor will not require relocation in the future due to the follow-on and/or sequence of work by Contractor or other contractors or by changes in scope and sequence of work by the Owner.

E. Temporary utilities placed underground shall be permanently marked as to prevent damage by others, and accurately located for removal. Damage to above ground and underground utilities by the Contractor or others shall be repaired or replaced by the Contractor at not cost to the Owner.

F. Temporary utilities include, but are not limited to, the following:
1. Water service and distribution
2. Electric power service
3. Lighting
4. Telephone service

G. Support facilities include, but are not limited to, the following:
1. Project identification and temporary signs
2. Waste disposal facilities
3. Temporary heat and ventilation
4. Field offices and storage boxes
5. Sanitary facilities, including drinking water
6. Temporary enclosures, fencing and barricades
7. Construction aids and miscellaneous services and facilities
8. Storm water control and drainage

H. Security of the buildings shall be maintained at all times. Security and protection facilities include, but are not limited to, the following:
1. Environmental protection
2. Security enclosure and lockup
3. Temporary fire protection
4. Barricades, warning signs, lights
5. Shoring and scaffolding

I. Removal of Temporary Facilities
1. Remove temporary facilities and controls, including associated materials and equipment, when their use is no longer required.
2. Restore and recondition areas of the site damaged and disturbed by temporary facilities and controls and their installation.
3. Remove and properly dispose of debris resulting form removal and reconditioning operations.

J. Submittals
1. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
2. Implementation and Termination Schedules: Submit a schedule indicating implementation of each temporary utility within 15 days of the date established for commencement of the Work.

1.03 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner, Construction Manager or Architect and shall be included in the Contract Sum. Contractor shall be responsible for his/her own temporary power and for coordination with Pacific Gas and Electric Company (PG&E) for that temporary power service. Multiple temporary power services to the site may be required due to availability of power. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
1. Owner's Representatives
2. Inspection and/or Testing agencies
3. Personnel of authorities having jurisdiction

1.04 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
1. Building Code requirements
2. Health and safety regulations
3. Utility company regulations
4. Police, Fire Department and Rescue Squad rules
5. Environmental protection regulations.

B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70 and applicable codes.
3. Refer to Guidelines for Bid conditions for Temporary Job Utilities and services prepared jointly by AGC and ASC for industry recommendations.

C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
1. Keep temporary services and facilities clean and neat
2. Relocate temporary services and facilities as required by progress of the Work
3. Operate in a safe and effective manner
4. Take necessary fire prevention measures
5. Do not overload facilities, or permit them to interfere with progress
6. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the Site.
7. Allow free use and access of all utilities at all times to all entities contracted to perform the Work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by the Construction Manager. Provide materials suitable for use intended. Provide specified utility services

required during construction and extend temporary service lines to construction areas to allow use by all trades, and subcontractors.

B. Paint: Comply with requirements in Section 09 91 00 "Painting".
1. For sign panels and applying graphics, provide exterior grade alkyd glass enamel over exterior primer.

C. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame spread rating of fifteen (15) or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

D. Water: Provide potable water approved by local health authorities.

E. For fences and vision barriers, provide exterior type, minimum 3/8" thick plywood.
1. For safety barriers, sidewalk bridges and similar uses provide minimum 5/8" thick exterior plywood.

2.02 EQUIPMENT

A. General: Provide equipment and materials suitable for use intended.

B. Field Offices: Provide mobile units with lockable entrances, operable windows, serviceable finishes, heated, air conditioned and on foundations adequate for normal loading. Comply with all applicable codes and requirements.

C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

D. Temporary Toilet Units: Provide a sufficient number of self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Units shall be accompanied by hand washing stations, including paper towels and covered trash receptacles in accordance with governing regulations.

E. Drinking-Water Fixtures: Containerized, bottled-water drinking-water units, including paper cup supply.
1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).

F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

H. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

I. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where fixtures are exposed to breakage. Provide exterior fixtures where exposed to moisture.

J. Trash removal: The Contractor shall be responsible for providing trash receptacles. He/she shall be responsible for the removal of debris from the job site and shall keep all work areas and passageways in and around the project free from debris. Collect waste from construction areas daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above eighty (80) deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately form other waste by containerizing properly. Dispose of material in a lawful manner. Owner trash facilities may not be used. If, in the Construction Manager's opinion, the contractor has not performed due diligence in keeping the site clean on a weekly basis, monies will be withheld from the contractor's monthly progress payment in the maximum amount of $1,000.00 per weekly occurance. This notification will come from the Construction Manager in writing. These accumulated monies will be released to the contractor in the contractor's next pay application upon verification by the Construction Manager that the site has been cleaned.

K. First Aid Supplies: Comply with governing regulations.

L. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses one hundred feet long (100'), with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
4. Arrange with electric utility service company to provide service for power and lighting for temporary field offices. Pay costs for service and power used.
5. Distribute electric power and lighting.
6. Provide lighting and convenience outlets in the temporary structures, and as otherwise required for the performance of the Work.
7. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Construction Manager, change over from use of temporary service to use of the permanent service.
8. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

B. Water Service: Existing well to be demolished at the North East portion of the site is available in its existing condition for Contractor's use for temporary construction water, prior to demolishing. Contractor shall be responsible for all work and associated costs to make the well operable.
1. Contractor may connect to existing water point of connection for their use. Contractor is responsible for flushing and sterilizing new and existing piping prior to connection. Owner is not responsible for any damage to Contractors system or equipment due to inadequate flushing or sterilization of existing piping.
2. Provide water for construction purposes.
3. Install branch piping with taps located so that water for demolition, grub, clear, compaction, and construction purposes is available throughout the Work by the use of hoses. Protect piping and fitting against freezing.
4. Make potable water available for human consumption.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   1. Locate as approved by the Construction Manager.
   2. Provide containers to remove and dispose of effluent off the site in a lawful manner.

D. Electric Power Service: Contractor may tap into site electrical service at the existing Building 2 main electrical room. Contractor must install power meter for monitoring construction power.

E. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment in quantity, size and type acceptable for each phase of the Work.

F. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities.

   1. Provide one telephone and one facsimile machine (FAX) in each Contractor's field office and pay costs for installation, maintenance, service, and removal.

3.03 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities as directed by the Construction Manager.
   2. Provide noncombustible construction for offices, shops, and sheds located within thirty (30) feet of building lines. Comply with NFPA 241.
   3. Maintain support facilities until Completion as necessary. Remove upon completion of the Contractor's final contract milestone and written approval by the Construction Manager. Personnel remaining after Notice of Completion may be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Heat and Ventilation: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy. Provide forced ventilation of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors and gases. Pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.

C. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within the designated building site.

D. Toilets: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Units shall be accompanied by hand washing stations, including paper towels and covered trash receptacles in accordance with governing regulations.

1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

E. Drinking Water Fixtures: Provide drinking water as required by OSHA, including paper supply.

F. Temporary Enclosures: Provide temporary enclosures for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.

1. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of twenty-five (25) square feet or less with plywood or similar materials.
2. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with venting and material drying and curing requirements to avoid dangerous conditions and effects

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section 2.09 C.4 "Housekeeping" and Article 3.05 of this section for progress cleaning requirements.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until requested by the Construction Manager.

B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities, including but not limited to, water truck or water storage tank, fire hoses, nozzles and fire extinguishers. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
   1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one (1) extinguisher for every seventy-five (75') of travel.
   2. Store combustible materials in containers in fire-safe locations.
   3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
   4. Provide fire extinguisher access and supervision welding operations and similar sources of fire ignition.
   5. Provide water truck or other means to provide temporary fire protection until such time as permanent fire protection is in service.

C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for the erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public, of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

E. Environmental Protection:
   1. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.
   2. Avoid use of tools and equipment which produce harmful noise.
   3. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons in or near the site.
   4. Erosion and Sediment Control: Prepare and implement a comprehensive erosion and sediment control program. Perform daily cleanup of mud and dust carried onto street surfaces by construction vehicles. Throughout excavation, haul trucks shall use tarpaulins or other effective covers. Upon completion, use effective measures to reduce wind erosion. Perform replanting and repaving operations as soon as practicable after site grading.
   5. Air Quality / Dust Control:
      a. Indoor Operations: Control dust resulting from indoor construction operations by localizing it to greatest possible extent using

temporary partitions, curtains, or other means which will prevent spread of dust beyond immediate work area. Duct openings and other openings communicating with other parts of building shall have effective temporary closures.

b. Outdoor operations: Provide dust control as required to abate any dust nuisance on or adjacent to Project Site. Apply water by means of approved sprinkling equipment, water wagons, or spray from hoses, to extent and amount required at any time that dust control is necessary, as determined by the City or Construction Manager. Use of chemicals, oil or other such materials will not be permitted.

F. Provide and maintain suitable temporary barriers as required to prevent public entry; protect the work and existing facilities, persons, and trees and plants from damage or injury from construction operations.

G. Preserve and protect existing trees, irrigation, all landscaping and plants not designated or required to be removed, and those adjacent to the site. As required, provide barriers to a minimum height of 6'-0" around each tree and plant, or around groups in proximity of construction operations.

3.05 CLEANING DURING CONSTRUCTION

A. Contractor shall dispose of all material off-site, in a lawful manner. Do not allow the accumulation of scraps debris, waste material and other items not required for construction of this work. Remove waste materials and rubbish not less than on a weekly basis and dispose of at Contractor's expense.

B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

C. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.

D. Each sub-contractor shall clean up the results of his/her work and deliver such debris to areas designated for holding by Prime Contractor.

E. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this sub-paragraph, shall be interpreted as meaning free from dust and other materials capable of being removed by reasonable diligence using a hand-held broom.

F. Following the installation of finish floor materials, clean the finish floor and provide adequate protection. Inspect protection daily (or more often if necessary) while work is being performed in the space in-which finish materials have been installed. "Clean", for the purpose of this sub-paragraph, shall be interpreted as meaning free from all foreign materials which, in the opinion of the Construction Manager or Architect, may be injurious to the finish floor material.

3.06 OPERATION, TERMINATION AND REMOVAL

A. Maintenance: Maintain facilities in good operating condition until removal. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a twenty-four (24) hour/day basis where required to achieve indicated results and to avoid the possibility of damage.

B. Termination and Removal: Unless the Construction Manager requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by the authorized use of a permanent facility, or no later than the Final Billing. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of the Project identification signs.
   2. Prior to Notice of Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
      a. Replace air filters and clean the inside of ductwork and housings.
      b. Replace significantly worn parts and parts that have been subject to unusual operating conditions as determined by the Construction Manager.
      c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

3.07 TREE AND PLANT PROTECTION

A. Preserve and protect existing trees, plants and grapevines which are not designated or required to be removed, and those adjacent to the site.

B. Consult with the Construction Manager prior to removal of roots and branches which interfere with demolition and construction operations. Remove only those items agreed upon in writing with the Construction Manager.

C. Provide barriers to a minimum height of 6' around each tree and plant, around each group of trees and plants, as applicable, in the proximity of demolition and construction operations.

D. In the proximity of root zones of trees and plants:
   1. Prohibit vehicular traffic and parking.
   2. Prohibit storage of materials and equipment.
   3. Prevent dumping of refuse and chemically injurious materials and liquids.
   4. Prevent puddling and continuous running water.

E. Carefully supervise excavating, grading, and filling, and subsequent construction operations, to prevent damage.

F. At no increase in Contract Sum, replace, or suitably restore trees and plants designated to remain which are damaged or destroyed as a result of demolition and construction operations.

G. Remove and lawfully dispose of soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at no increase in Contract Sum. Provide manifests for removed soil to Construction Manager.

3.08 SECURITY

A. Secure, maintain, and protect the Work, stored materials, equipment, and temporary facilities until time of Final Completion, or such earlier time as Owner may choose to assume such responsibility.

B. Security and protection may be by any legal method, or combination of methods, acceptable by the Construction Manager.

3.09 TEMPORARY CONTROLS

A. Noise and Vibration:
1. Equipment and impact tools shall have intake and exhaust mufflers.
2. Secure written permission from the Construction Manager at least three (3) working days prior to using noisy and vibratory equipment, such as jackhammers, concrete saws, impact tools, and high-frequency electrical equipment.
3. Cooperate with the Owner and/or Construction Manager if the use of noisy and vibratory equipment becomes objectionable by its longevity.

B. Dust and Dirt:
1. Conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in Work and adjacent areas.
2. To additionally minimize the generation of dust and dirt, hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins.
3. Prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain lines.
4. Periodically water exterior demolition and construction areas to minimize the generation of dust and dirt.

C. Water: Do not permit surface and subsurface water and other liquids to accumulate in or about the Project site and vicinity thereof. Should such conditions develop, control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.

D. Pollution:
   1. No burning of refuse, debris, or other materials shall be permitted on or in the vicinity of the Project site.
   2. Comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of construction and disposal operations.

E. Pest Control: Take necessary provisions to control rodents, insects, and other pests.

3.10 PROJECT IDENTIFICATION AND SIGNS

A. General:
   1. Contractor shall have provisions in their contract to provide a 4'-0" x 8'-0" project identification sign with graphics and verbiage given to them by the Construction Manager. No other language or graphics will be permitted the sign other than what is approved by the Construction Manager. Contractor shall construct and maintain, at the contractors cost, this identification sign throughout the entire course of the project. Location of the sign will be provided by the Construction Manager.
   2. Signs other than the specified Project sign will not be permitted, unless otherwise approved in advance by the Construction Manager. No Contractor signs or banners are allowed on the temporary fence.

3.11 SITE CONTROLS AND PARKING

A. Entrance to Work Site: Contractor and his/her employees shall use certain access roads or entrances as indicated on attached drawing or as directed by Construction Manager. Maintain these roads in satisfactory condition during Contract time, and repair damages attributable to Work of this Project at intervals as needed. At completion of Contract, roads and entrances shall be left in condition at least equal to that existing at start of Contract, except as may be otherwise required by Contract Documents.

B. Site Storage and Work Areas: Construction Manager will allocate available on-site storage and work areas to Contractor, subject to change as may be necessary by job progress such as site development or other intervening Work.

C. Regulations: Observe and comply with rules and regulations in effect at occupied facilities, including, but not restricted to, parking and traffic regulations, security restrictions, hours of access, etc.

D. Use of Public Sidewalks and Streets: Make arrangements with local authorities including Traffic Engineer, for temporary use of streets and sidewalks for offices, shops, storage, etc. Abide by County rules, regulations, and ordinances. Obtain permits and pay all required fees.

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SECTION 01 61 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
B. The Contractor's Construction Schedule is included in Section 01 32 00, "Construction Progress Documentation"; and the Schedule of Submittals is included under Section 01 33 23, "Submittal Procedures".
C. Administrative procedures for handling requests for substitutions are included under Section 01 25 00, "Substitutions Procedures".

1.03 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.
   1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
      a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
   2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
   3. "Equipment", is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.04 DESCRIPTION

A. Material and equipment incorporated in the Work shall be:

1. New, unless otherwise specified.
2. In a condition acceptable to the Owner and the Architect.
3. Suitable for the use intended.
4. In conformance with EPA codes and regulations and applicable air quality control district.

B. No material or equipment shall be used for any purpose other than that for which it is designed or specified.

C. No material shall contain asbestos.

D. No materials or products shall contain formaldehyde in excess of the amount recommended by the State of California Department of Health Services (DOHS).

1.05 TRANSPORTATION AND HANDLING

A. Deliver manufactured products in the manufacturer's original, unbroken containers or packaging, with identifying labels intact and legible.

B. Immediately on delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and reviewed submittals, and to verify that products are properly protected and undamaged.

C. Handle products in a manner to avoid soiling and damaging the products and their packaging.

D. Promptly remove damaged and defective products from the site, and replace at no increase in Contract Sum.

1.06 STORAGE

A. Store manufactured products in accordance with the manufacturers' printed instructions, with seals and labels intact and legible.
1. Store products subject to damage by the elements in weathertight enclosures.
2. Maintain temperature and humidity within the ranges specified by the manufacturers.

B. Exterior Storage:
1. Store fabricated products above the ground, on blocking or skids, to prevent soiling and staining.
2. Cover products which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
3. Store loose granular material in a well-drained area on solid surfaces to prevent mixing with foreign matter.

C. Arrange storage to facilitate inspection.

D. Periodically inspect stored products to assure that products are maintained under specified conditions and free from damage and deterioration.

E. Protection After Installation:
   1. Provide substantial coverings as necessary to protect installed products from damage from traffic and construction operations. Remove coverings when no longer needed.
   2. Maintain temperature and humidity conditions for interior equipment and finish products in accordance with the manufacturers' printed instructions.

1.07 PRODUCT OPTIONS

A. For products indicated or specified only by reference standard, select any product meeting such standard.

B. For products indicated or specified by naming several products or manufacturers, select any one (1) of the products or manufacturers named which complies with the specified requirements.

C. For products indicated or specified by naming only one (1) product and manufacturer, there is no option.

D. Products not meeting the criteria hereinabove, shall be considered Substitutions, and shall be submitted as specified under Section 01 25 00 "Substitution Procedures".

E. "Or accepted equal" means a product accepted in writing by the Architect prior to bid opening for use in the Work as being equivalent in essential attributes to the product indicated or specified in the Contract Documents. Reference Section 01 25 00 “Substitution Procedures”.

1.08 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Each Contractor is responsible for providing products and construction methods compatible with products and construction methods of other Contractors.

D. If a dispute arises between Contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

E. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are new and undamaged and unused at the time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience.
1. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "Substitutions" for selection of a matching product in another product category, or for on compliance with specified requirements.
2. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that

complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.

PART 3 – EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Notice of Completion.

END OF SECTION

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SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 DESCRIPTION

A. Layout and install the Work to the lines and grades indicated and specified.

B. Retain and pay expenses of a qualified engineer or land surveyor to establish on the site the required reference points and bench marks, establish building lines and elevations, check structural steel framework for plumbness, and establish on steel frame the required basic grid lines from which Work of other sections shall be laid out.

1.03 QUALIFICATIONS OF ENGINEER OR SURVEYOR

A. The engineer or land surveyor shall be licensed in the State of California and shall be acceptable to the Owner.

1.04 SURVEY REFERENCE POINTS

A. Existing basic horizontal and vertical control points for the project are indicated.

B. Locate and protect control points prior to starting site Work, and preserve permanent reference points during construction.

1. Make no changes or relocations without prior authorization from the Construction Manager.

2. Report to the Construction Manager if a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. Require land surveyor to replace control points which become lost or destroyed; base replacements on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

A. Establish lines and levels; locate and layout:

1. Site Improvements:
   a. Stakes for grading, fill and topsoil placement.
   b. Utility slopes and invert elevations.
2. Batter boards for structures.
3. Building foundations, column locations.
4. Controlling lines and levels required for mechanical and electrical work.

B. From time to time verify layouts to ensure accuracy.

1.05 RECORDS

A. Maintain a complete, accurate log of control and survey Work as it progresses.

1.06 SUBMITTALS

A. Submit name and address of civil engineer and land surveyor.

B. Upon request, submit documentation to verify accuracy of field engineering Work.

C. Submit record documents under provisions of Section 01 77 19.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

C. Divisions 2 through 40 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 22 through Division 28 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.03 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after Installation of other Work.

1.04 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

B. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.

C. Describe anticipated results in terms of changes to in-place construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.

D. List products to be used and firms or entities that will perform work.

E. Indicate dates when cutting and patching is to be performed.

F. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

G. Construction Managers approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

H. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations signed and sealed by a structural engineer licensed to practice in the State of California to show how reinforcement is integrated with the original structure.

I. Review of the Contractor's submittal by the Engineer to proceed with cutting and patching does not waive the Engineer's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.05 QUALITY ASSURANCE:

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

B. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
   1. Foundation construction.
   2. Bearing and plywood sheathed shear walls.
   3. Structural concrete and steel.
   4. Equipment supports.
   5. Piping, duct work, vessels and equipment.
   6. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in reducing their safety to perform as intended, or result in increased maintenance, or decreased operational life or safety.

C. Obtain approval of cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
   1. Primary operational systems and equipment.
   2. Control systems.
   3. Communication systems.
   4. Electrical wiring systems.

5. Operational systems of special construction in Division 13 Sections.

D. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise- and vibration-control elements and systems

E. Visual Requirements: Do not cut and patch work exposed on the exterior or in occupied spaces, in a manner that would, in the County's Construction Engineer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
1. If possible, retain original installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized experienced, and specialized firm. Contractor will be responsible to warranty all work.
a. Processed concrete finishes.
b. Stonework and stone masonry.
c. Ornamental metal.
d. Matched-veneer woodwork.
e. Preformed metal panels.
f. Roofing.
g. Firestopping.
h. Window wall system.
i. Stucco and ornamental plaster.
j. Terrazzo.
k. Finished wood flooring.
l. Fluid-applied flooring.
m. HVAC enclosures, cabinets, or covers.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.01 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and action before proceeding, if unsafe or unsatisfactory conditions are encountered.

B. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or duct work serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete work without delay.
   1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.
   1. In general, where cutting is required use hand of small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
   3. Cut through concrete and masonry using a cutting machine that is appropriate for the work to be done.

4. Comply with requirements of applicable Sections of Division 31 where cutting and patching requires excavating and backfilling.
5. By-pass utility services such as pipe and conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap valve or plug and seal the remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
6. Patch with durable seams that are as invisible as possible. Comply with tolerances.
7. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
8. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction to break of plane in a manner that will eliminate evidence of patching and refinishing.
9. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance. Replace wall coverings to break of plane if required for match.
10. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.
11. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
12. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.

3.04 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

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SECTION 01 74 00

CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section and provide final cleaning as described in this section and in Section 01 77 19 "Project Closeout".

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General and Special Conditions of the Agreement, and Sections in Division 1 of these Specifications.
   2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.
   3. Refer to Section 01 74 19 "Construction Waste Management" for special requirements related to construction waste.

1.02 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

A. General:
   1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site. No on-site disposal, burning or burial as permitted.
4. Provide adequate storage containers for all construction waste debris and rubbish, and for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment. Comply with all state and local construction/solid waste disposal requirements.

B. Site:
1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.1-A-1 above.
3. Maintain the site in a neat and orderly condition at all times. Remove and/or cut weeds in work areas periodically as required for duration of the contract.

C. Structures:
1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
   a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
   a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

3.02 FINAL CLEANING

A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.

C. Site:
1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.
2. Completely remove resultant debris prior to final grading and landscaping.

D. Structures:
1. Exterior:
a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
(1) Remove all traces of splashed materials from adjacent surfaces.
(2) If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
b. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
2. Interior:
a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
(1) Remove all traces of splashed material from adjacent surfaces.
(2) Remove paint droppings, spots, stains, and dirt from finished surfaces.
3. Glass: Clean inside and outside. Clean Mirror.
4. Polished surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

E. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work. Final cleaning shall be completed prior to requesting final punch list inspection/observation.

3.03 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

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SECTION 01 74 19

CONSTRUCTION WASTE MANAGMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Preparation and implementation, including reporting and documentation, of a Waste Management Plan for reusing, recycling, salvage or disposal of non-hazardous waste materials generated during demolition and/or new construction (Construction & Demolition (C&D) Waste), to foster material recovery and re-use and to minimize disposal in land fills.

B. Related Sections
1. Section 01 31 00 Project Management and Coordination.

1.02 REFERENCES

A. California Integrated Waste management Act of 1989 (AB 939)

B. California Code of Regulations Title 14, Section 18700

1.03 ACTION SUBMITTALS

A. Waste Management Plan (Appendix A): Within 10 calendar days after the Notice to Proceed and prior to any waste removal, submit the following to the Architect for review and approval. Update quarterly. Include:
1. Materials to be recycled, reused, or salvaged, either onsite or offsite.
2. Estimates of construction waste quantity (in tons) by type of material. (If waste is measured by volume, give factors for conversion to weight in tons.)
3. Procedures for recycling/ reuse program.
4. Permit or license and location of Project waste-disposal areas.
5. Site plan for placement of waste containers.

B. Waste Management Monthly Progress Report (Appendix B): Summary of waste generated by Project, monthly with Application for Payment. Include:
1. Firms accepting the recovered or waste materials.
2. Type and location of accepting facilities (landfill, recovery facility, used materials yard, etc.). If materials are reused or recycled on the Project site, location should be designated as "on-site reuse / recycling".
3. Type of materials and net weight (tons) of each.
4. Value of the materials or disposal fee paid.
5. Attach weigh bills and other documentation confirming amount and disposal location of waste materials.

C. Waste Management Final Compliance Report: Final update of Waste Management Plan to provide summary of total waste generated by Project.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Collection and separation of all construction waste materials generated on-site, reuse or recycling on-site, transportation to approved recyclers or reuse organizations, or transportation to legally designated landfills, for the purpose of recycling salvaging and/or reusing a minimum of 90% of the construction waste generated.

PART 3 - EXECUTION

3.01 IMPLEMENTATION

A. Implement approved Waste Management Plan including collecting, segregating, storing, transporting and documenting each type of waste material generated, recycled or reused, or disposed in landfills.

B. Designate an on-site person to be responsible for instructing workers and overseeing the sorting and recording of waste/recyclable materials.

C. Include waste management and recycling in worker orientation and as an agenda item for regular Project meetings.

D. Recyclable and waste bin areas shall be limited to areas approved on the Waste Management Plan. Keep recycling and waste bins neat and clearly marked to avoid contamination of materials.

3.02 ATTACHMENTS

A. Appendix A: Waste Management Plan

B. Appendix B: Waste Management Monthly Progress Report

END OF SECTION

APPENDIX A

WASTE MANAGEMENT PLAN

Date: _____

Within 10 calendar days after the Notice to Proceed and prior to any waste removal, the Contractor [Construction Manager] shall submit the following to the Architect for review and approval. Update quarterly.

PROJECT: OWNER:

_____

CONTRACTOR [CONSTRUCTION MANAGER]

Name:

Address:

Telephone, fax, email:

Material Type (1)	Estimated Tons Recycled (2)	Estimated Tons Reused (3)	Estimated Tons Salvaged (4)	Estimated Tons Landfilled (5)	Proposed Disposal or Recycling Facility (6)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					

(1) Provide type of material targeted for recycling, reuse, and/or salvage, either on or off site, and include a category for general waste materials requiring landfill disposal.

(2) through (4) Provide estimated quantities (in tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated.

(5) Provide estimated quantities (in tons) of material to be disposed in landfill.

(6) Provide destination of recycled, salvaged, and disposed materials (i.e. onsite, recycling facility, etc.)

General: Attach proposed Recycling & Waste Bin Location Plan.

Attach name and contact data for each recycling or disposal destination to be used.

APPENDIX B

WASTE MANAGEMENT MONTHLY PROGRESS REPORT

Starting Date _____

Ending Date _____

Contractor [Construction Manager] shall submit this report monthly along with Application for Payment.

PROJECT: OWNER:

_____

CONTRACTOR [CONSTRUCTION MANAGER]

Name:

Address:

Telephone, fax, email:

Material Type (1)	Actual Tons Recycled (2)	Actual Tons Reused (3)	Actual Tons Salvaged (4)	Actual Tons Landfilled (5)	Disposal or Recycling Facility (6)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					

(1) Provide type of materials recycled, reused, and/or salvaged, either on or off site, and include a category for general waste materials disposed in a landfill.

(2) through (4) Provide quantities (in tons) of recyclable, reusable, or salvageable waste materials generated.

(5) Provide quantities (in tons) of material disposed in landfill.

(6) Provide destination of recycled, salvaged, and disposed materials (i.e. onsite, recycling facility, etc.)

General: Attach name and contact data for each recycling or disposal destination to be used.

SECTION 01 77 19

PROJECT CLOSEOUT AND RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
   1. Inspection procedures
   2. Project record document submittal
   3. Operation and Maintenance Data
   4. Instruction of Owner's personnel
   5. Service and maintenance contracts
   6. Submittal of guarantees/warranties and bonds
   7. Final Cleaning
   8. Restoration of damaged and remedial work
   9. Delivery of extra materials

B. Process individual buildings, site package and landscape package separately for project closeouts.

1.03 FINAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Final Completion, complete the following. List exceptions in the request.
   1. In the Application for Payment that coincides with, or first follows, the date Final Completion is claimed, show 100 percent (100%) completion for the portion of the Work claimed as complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of charges to the Contract Sum.
      a. If 100 percent (100%) completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   2. Advise Construction Manager of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
5. Complete final clean up requirements, including touch-up painting. Touch up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Construction Manager will either proceed with inspection scheduling or advise the Contractor of unfilled requirements. The Construction Manager will prepare the Notice of Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the Notice will be issued.
1. The Construction Manager will repeat inspection scheduling when requested and assured that the Work has been completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Construction Manager's and Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Construction Manager and Architect.
4. Submit record drawings, damage or settlement survey, property survey, and similar final record information.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: The Construction Manager will reinspect the Work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Construction Manager.
1. Upon completion of reinspection, the Construction Manager will prepare a Notice of Completion, or advice the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final completion.
2. If necessary, the reinspection procedure will be repeated.

1.05 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record drawings for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Owner, Construction Manager and Architect reference during normal working hours.

B. Record Drawings: Maintain clean undamaged set of prints of Contract Drawings and Shop Drawings. Mark the set in the manner approved in advance by the Construction Manager to show the actual installation where the installation varies from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Label each document "PROJECT RECORD" in large, neat, printed letters. Failure to maintain record drawings shall result in withholding of Contractor's payment. See provisions in Section 2.24 – Payment, located in the General Conditions.
   1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
   2. Mark information that is important to the Owner, but was not adequately shown on Contract Drawings or Shop Drawings.
      a. Changes made by Change Order and other modifications described in the GENERAL CONDITIONS noting the change or modification source.
      b. Locations of significant Work concealed inside the building whose general locations have been changed from those shown on the Contract Documents
      c. Locations of items, not necessarily concealed, which have been changed, with the Architect's prior written approval, from the location shown on the Contract Documents.
      d. Revisions to routing of piping and conduit.
      e. Revisions to electrical circuitry.
      f. Actual equipment locations.
      g. Ducting Size and routing.
   3. Note related Change Order or Work Authorization number where applicable.
   4. Organize Record Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.
   5. Keep up to date during entire progress of the Work, and furnish additional drawings as necessary for clarification. Failure to maintain record drawings shall result in withholding of Contractor's payment. See provisions in Section 2.24 – 'Payment', located in the General Conditions.
   6. Record deviations from the sizes, locations, and other features of installations shown in the Contract Documents.
   7. Establish locations of underground Work by Global Positioning Systems (GPS) and reference invert elevations and rates of fall.

8. Give sufficient information to locate Work concealed in the building.
9. Locate main runs of piping, conduit, ductwork and similar items by dimensions.
10. Locate other items either by dimensions or in relation to spaces within the building.
11. Where feasible, the individual or entity that obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on Record Drawings.
12. Accurately record information in an understandable drawing technique.
13. Record data as soon as possible after it has been obtained. In the case of concealed installation, record and check the mark-up prior to concealment.

C. As-Built Drawings:

1. At time of acceptance of the Work and prior to final payment, using the record drawings for reference, prepare "As-Built" drawings on permanent, transparent, reproducible prints furnished by the Architect. Furnish reproducible record drawings, made from final Shop Drawings, which have been updated to show actual conditions, for Work specified in the individual Specification sections. Where Shop Drawings are marked, show cross-reference on "As Built" Drawings.
   a. Employ and pay a professional draftsperson to prepare the "As-Built" drawings from the record drawings, using typical drafting devices and recording information in ink clouding all changes.
   b. After completing the preparation of transparency record drawings, produce three (3) copies of each Drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.
   c. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
   d. Organize record mylar transparencies into sets matching the print sets. Reverse roll and place these sets in durable tube-type Drawing containers with end caps. Mark the end cap of each container with suitable identification.
   e. Sign and date the completed Project "As Builts" and transmit them to the Construction Manager, who will forward them to the Owner after final acceptance of the Work.

D. Large-Scale Coordination Drawings:
1. The preparation of large-scale, detailed coordination drawings will be required for the Work of Divisions 22, 23, 26, 27, 28 and 31 of these Specifications. These coordination drawings are not Shop Drawings as defined by the General Conditions, but, together with Shop Drawings or coordination drawings of other affected Work, are used to check, coordinate, and integrate the various types of Work.

2. If furnished, include the coordination drawings as part of the Project "As-Builts".

E. As-Built Construction Schedule:
1. Using as a basis the latest, updated Progress Schedule required by Section 01 33 23 "Submittals," prepare and transmit a Record Construction Schedule to indicate the actual dates and durations of the various construction activities.

F. Record Specifications: Maintain one (1) complete copy of the Project Manual, including addenda, and one (1) copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.
1. Mark each Specification SECTION to record:
   a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually incorporated in the Work.
   b. Changes made by Change Order and other modifications described in the GENERAL CONDITIONS

G. Operation and Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data into individual heavy-duty 2-inch, 3-ring vinyl-covered binder, with pocket folders for folded sheet information. Mark the appropriate identification on front spine of each binder. Provide index near front of binder furnishing immediate information as to locations in the manual of all emergency data regarding the equipment included in the manual. Provide entire contents of Binder on Compact Disc organized in same sequence as binder.
1. Include the following types of information:
   a. Emergency instructions
   b. Spare parts list
   c. Copies of warranties
   d. Wiring diagrams
   e. Recommended maintenance schedules and a list of maintenance performed during the construction process.
   f. Inspection procedures
   g. Shop drawings and product data
   h. Fixture lamping schedule.
   i. Complete nomenclature of replaceable parts, their part numbers, current cost and name and address of nearest source of parts.
   j. Copy of each guarantee/warranty and service contract issued for the equipment included in the manual.
   k. Delete Extraneous Data from manufacture's catalog pages, information, which is not applicable to this project installation.

l. Video tape of Training Procedures

2. Submittal Schedule: Comply with the following schedule for submittal of operating and maintenance manuals.
   a. Before submittal of Request for Final Payment, when each installation that requires submittal of operating and maintenance manuals is nominally complete, submit two (2) draft copies of each manual to the Construction Manager for review. Include a complete index or table of contents.
   b. The Construction Manager will return one (1) copy of the draft with comments within fifteen (15) days of receipt.
   c. Submit one (1) copy of the manuals in final form at least fifteen (15) days before final inspection. This copy will be returned within fifteen (15) days after Final Inspection, with comments.
   d. After final inspection, make corrections or modifications to comply with the Construction Manager's comments. Submit the specified number of copies of each approved manual to the Construction Manager within fifteen (15) days of receipt of Construction Manager's comments

H. Operation Tests
   1. Conduct systematic start-up and operational tests as required to demonstrate that all systems have been completed and are in compliance with all requirements of the Contract Documents, and are fully functioning and operational. Contractor shall coordinate his/her start-up and operational tests with contractors performing work under other bid packages.
   2. Furnish a written record of test results using recording type instruments where applicable

I. Upon completion of the Work, submit Close out Documents to the Construction Manager for the Owner's records.

J. Transmit manuals in the quantity which is required to be returned, plus the following, unless otherwise specified, which will be retained by the Construction Manager for forwarding to the Owner after acceptance of the work.
   1. Four (4) copies of Mechanical and Electrical manuals and one (1) copy on CD.
   2. Two (2) copies of all other manuals and one (1) copy on CD.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.01 CLOSEOUT PROCEDURES

A. Owner's Training Sessions: Arrange for each installer of equipment that requires regular maintenance to provide DVD-recorded Owner's training sessions. Arrange for each installer of equipment that requires regular maintenance, to

meet with the Owner's personnel to review contractor furnished DVD-recorded instruction in the proper operation and maintenance of each component of each system. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals
2. Record documents
3. Spare parts and materials
4. Tools
5. Lubricants
6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning
11. Warranties, bonds
12. Maintenance agreements and similar continuing commitments

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up
2. Shut-down
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments
7. Effective and energy utilization.

C. Schedule training to conform to personnel availability at the facility and to conclude prior to start up of system. The base duration of training shall be determined by the complexity of the system or equipment and shall be done by qualified instructors from the manufacturer or contractor.

D. As part of the operator's training, one (1) lesson plan shall be devoted to reviewing of DVD, which shall be incorporated into the training program to allow new employees to view the DVD at their own convenience and be able to comprehend the system without the need for an instructor in attendance.

E. Prepare one (1) set of DVD's to assist maintenance personnel in trouble-shooting the systems and making routine repairs. All DVD's shall be made at the Project facility to ensure that the video portrayal is representative of the true systems.

F. In addition to written technical descriptions, the training shall lay out prescribed hands-on-training under the supervision of others who have previously completed the training program. The foregoing techniques are to be developed to produce a program that is self-perpetuating and permits a high level of operator training in the event of high turnover rates among those who are assigned to duties in maintenance.

3.02 FINAL CLEANING:

A. General: General cleaning during construction is required by the General Conditions and included Sections "Temporary Facilities and Controls" and "Cleaning".

1. Comply with applicable regulatory requirements during the cleaning and disposal operations. Special cleaning requirements for specific elements of the Work are included in appropriate Sections of Division 3 through 40.
2. Use cleaning materials, which will not create hazards to health or property or cause damage to products or Work. Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
3. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to a condition acceptable to the Construction Manager. Use cleaning materials and methods recommended by the manufacturer of the products to be cleaned.
4. Schedule operations with sufficient time for surfaces to dry thoroughly to prevent dust, and other contaminants resulting from cleaning operations from adhering to wet or newly finished surfaces.
5. Complete the following cleaning operations before requesting inspection for Certificate of Completion.
    a. Remove labels that are not permanent labels.
    b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable as vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
    c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, grease, fingerprints, labels, spills, spatters, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Mop clean concrete floors. Vacuum carpeted surfaces.
    d. Wipe surfaces of mechanical and electrical equipment, elevator equipment and similar equipment. Remove excess lubrication, paint, mortar droppings and other foreign substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps, vacuum inside of electrical panels and cabinetwork.
    e. Clean the Site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
    f. Clean permanent filters and replace disposable filters of units operated during construction.
    g. Clean ducts, blowers, and coils if units were operated without filters during construction.

h. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.

i. Touch up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or show evidence of repair or restoration. Do not paint over "UL" and similar labels including mechanical and electrical nameplates.

6. Pest Control: Engage an experienced exterminator to make a final inspection, and to rid Project of rodents, insects, and other pests.

7. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

8. Compliances: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

9. Materials remaining after completion of associated Work shall be disposed of or stored as directed by the Construction Manager.

END OF SECTION

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SECTION 01 78 36

WARRANTIES AND BONDS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties. Contractor will review guarantee/warranty and bonds to verify compliance with Contract Documents.
   1. Refer to Article 2.32 of the General Conditions and the separate Guaranty of workmanship and materials.
   2. General closeout requirements are included in Section 01 77 19 "Project Closeout."
   3. Specific requirements for warranties of the Work and products and installations that are specified to be warranted, are included in the individual Sections of Division - 3 through Division -40. If no specific information is included in individual sections of the specifications, warranty period shall be as follows: Manufacturer's warranties not withstanding, warrant the entire Work against defects in materials and workmanship for twelve (12) months from date of Notice of Completion.
   4. Certifications and other commitments and agreements for continuing services to the Owner are specified elsewhere in the Contract Documents.
   5. The Contractor will not be responsible for defects due to misuse, negligence, willful damage, improper maintenance, or accident caused by others, nor shall he be responsible for defective parts whose replacement is necessitated by failure of the Owner's maintenance forces to properly clean and service them, provided the Contractor has furnished complete maintenance instructions to the Owner.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 BOND REQUIREMENTS

A. Each bond specified in this Article (faithful performance bond, payment bond and warranty bond) shall meet the requirements of all applicable statutes, including but not limited to those specified in Public Contract Code section 20129 and Civil Code section 3248.

B. Each bond specified in this Article shall be issued by a surety company designated as an admitted surety insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and acceptable to the County of Fresno. Bidders are cautioned that representations made by surety companies will be verified with the California Department of Insurance. Additionally, the County of Fresno, in its discretion, when determining the sufficiency of a proposed surety company, may require the surety company to provide additional information supported by documentation. The County generally requires such information and documentation whenever the proposed surety company has either a Best's Key Rating Guide of less than B+ or a financial size designation of less than VIII. Provided, however, that the County expressly reserves its right to require all information and documentation to which the County is legally entitled from any proposed surety company.

C. Payment and Performance Bonds. The successful bidder shall furnish a faithful performance bond in the amount of 100 percent of the Contract Amount and a payment bond in the amount of 100 percent of the Contract Amount.

D. Warranty Bond. Prior to Final Payment, Contractor shall post a one (1) year Warranty Bond, issued by the surety company that issued the payment and performance bonds, or if approved by Owner, by another surety company that meets the requirements of this Article and is acceptable to Owner, in the amount of ten percent (10%) of the Final Contract Price.

1.04 DEFINITIONS RE: WARRANTIES

A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.05 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranty Work that has failed, remove and replace other Work that has been damaged as a result of

such failure or that must be removed and replaced to provide access for correction of warranty Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Costs: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
   1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.06 SUBMITTALS RE: WARRANTIES

A. Submit written warranties to the Construction Manager upon request of the Construction Manager, and in any event prior to any request by Contractor for final acceptance of the Work. The commencement date for warranties applicable to the Work shall be the date of acceptance of the Work as specified in the Notice of Completion, unless otherwise noted in the Contract Documents (e.g., as to manufacturer's warranties for equipment).
   1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Construction Manager within ten (10) days of completion of that designated portion of the Work.
   2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written

document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Construction Manager for approval prior to final execution.

1. Refer to individual Sections of Division - 3 through Division - 40 for specific content requirements, and particular requirements for submittal of special warranties.
2. Submit the Guarantee/Warranty typed on the Contractor's letterhead if for the entire Work, or on the Subcontractor's letterhead if for the Work of a Specification Section.

C. Form of Submittal: At Final Completion compile two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds into heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper. Provide separate binders for each building, site and landscape package.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name address and telephone number of the installer.
2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
3. When operating and maintenance manuals are required for warrantied construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

E. Time of Submittal

1. Submit guarantees/warranties within ten (10) days after date of Notice of Completion, prior to request for Final Payment.
2. For items of Work where acceptance is delayed materially beyond the date of Notice of Completion, furnish updated submittal within ten (10) days after such delayed acceptance, listing the date of delayed acceptance as the start of the guarantee/warranty period.

1.07 REVIEW MEETING:

A. Eleven (11) months following date of acceptance of the Work, hold a meeting for the purpose of review of, and action upon, guarantees/ warranties, bonds, and service and maintenance contracts, as specified in Section 01 31 19 "PROJECT MEETINGS".

1.08 SERVICE AND MAINTENANCE CONTRACTS

A. Compile, review, and transmit specified service and maintenance contracts as specified for guarantees/warranties and bonds.

1.09 PREPARATION FOR FINAL INSPECTION

A. Perform final cleaning as specified hereinbefore.

B. Assemble guarantees/warranties, service and maintenance contracts, operating and maintenance instructions, and other items as specified, and transmit to the Construction Manager, who will forward them to the Owner after final acceptance of the Work.

1.10 RESTORATION OF DAMAGED WORK

A. Restore or replace, as specified or determined by the Architect, material and finishes damaged from construction activities at no additional expense to the Owner.

B. Restoration shall be equal to the original Work, and finishes shall match the appearance of existing adjacent Work.

1.11 REMEDIAL WORK

A. Remedial Work necessary owing to faulty workmanship or materials shall be at no additional expense to the Owner.

B. Work shall be coordinated with the Owner and performed at such time and in such manner to cause minimal interruption and inconvenience to the Owner's operations.

1.12 EXTRA MATERIALS

A. Where required in the individual Specification SECTIONS, furnish extra materials in the quantities and manners specified. Prior to submitting any materials submit a list of all extra material required in the specification sections.

B. Delivery and certification of such extra materials shall be a prerequisite to Notice of Completion.

C. Deliver extra materials directly to Owner for sign-off.

D. Package in clearly identifiable boxes.

E. Indicate manufacturer's name, part name, and stock number.

F. Indicate piece of equipment part or tool is for.

G. Indicate name, address and phone number of closest supplier.

1.13 MISCELLANEOUS RECORD SUBMITTALS

Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Final Acceptance, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Construction Manager for the County's records.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION

SECTION 01 80 00

FACILITY OPERATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting and balancing.

1.02 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and Owner 7 days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper [lubrication, drive rotation, belt tension,] control sequence or other conditions that may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for each equipment are complete and tested.

F. Execute start-up under supervision of responsible manufacturer's representative or approved Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present as site to inspect, check and approved equipment or system installation prior to start-up and to supervise placing equipment or system in operation.

H. Submit written report that equipment or system has been properly installed and is functioning correctly.

1.03 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Product to Owner's personnel two weeks prior to date of Notice of Completion.

B. Demonstrate Project equipment and provide instruction by qualified manufacturer's representative who is knowledgeable about Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance and shutdown of each item of equipment at agreed-upon times at equipment location.

F. Prepare and submit to Architect a sign-in sheet with subject, date and time, signed by all participants for each session.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Amount of time required for instruction on each item of equipment and system is that specified in individual Sections.

1.04 TESTING, ADJUSTING AND BALANCING OF EQUIPMENT

A. Refer to Division 23 Heating, Ventilating, and Air Conditioning.

B. Owner will appoint, employ, and initially pay for services of independent firm to perform testing, adjusting and balancing. Amounts paid will be deducted by Change Order from the Contractor's final payment or from any funds due and payable.

C. Independent firm shall perform services specified in Division 22, Plumbing; Division 23, Heating Ventilation and Air Conditioning and Division 26, Electrical [including Division 11 and Division 14].

D. Reports shall be submitted by independent firm to Architect indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01 81 19

CONSTRUCTION INDOOR AIR QUALITY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes
1. Temporary construction ventilation, dust protection, preconditioning of materials, protection of materials, sequencing, duct protection, and duct cleaning to insure good indoor air quality after occupancy to be performed by the CONTRACTOR.

B. Related Sections
1. Section 01 31 00, Project Management and Coordination.
2. Section 01 61 00, Product Requirements.
3. Section 23 08 00 Heating, Ventilating and Air Conditioning.

1.02

A. SMACNA – IAQ Guidelines for Occupied Buildings Under Construction, 1995, Chapter 3.

B. ASHRAE Standard 52.2-1999 – Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size (ANSI approved)

C. ASHRAE Standard 62.1 – 2007, Section 7: Construction & Startup shall apply during construction and system startup. This includes protection of materials, air balancing (see paragraph 3.08 of 23 00 01) and testing of drain pans. Contractor shall maintain a copy of this Standard onsite during construction. Equipment that is started and operated prior to acceptance shall have the guarantee extended to cover that period. Owner guarantee shall start at acceptance.

1.03 CLASSIFICATION OF RELEVANT MATERIALS

A.
1. Section 06 10 00 Rough Carpentry
   a. Composite wood products containing added urea-formaldehyde
2. Section 06 40 00 Architectural Woodwork
   a. Adhesives applied on-site.
   b. Composite wood products containing added urea-formaldehyde.
3. Section 07 92 00 Joint Sealants
   a. All joint sealers applied on-site on the interior side of the building envelope.
4. Section 09 30 00 Tiling
   a. Adhesives and joint sealers applied on the interior side of the building envelope.
5. Section 09 65 13 Resilient Base.
6. Adhesives.
   a. Section 09 68 00 Carpeting

a. Carpet
b. Adhesives

7. Section 09 91 00 Painting

B. Porous and Fibrous Materials
1. Section 09 68 00 Carpeting

1.04 SUBMITTALS

A. Submit eighteen (18) photographs documenting compliance with this Section. Provide six (6) photographs each at three (3) different phases of construction.

B. Contractor shall develop and submit to the Architect for review the Construction Indoor Air Quality (IAQ) Plan as required in this Section. A template form is provided as Appendix A of this Specification. The plan shall be submitted along with the first submittal for any of the products listed above.

1.05 SUBSTITUTIONS

A. Construction Indoor Air Quality (IAQ) requirements described below are based upon practices described in SMACNA *IAQ Guidelines for Occupied Buildings Under Construction*, 1995. Any modifications to or substitutions of requirements described in this Section must comply with the abovementioned SMACNA guideline. Any modifications to or substitutions of requirements described in this Section must comply with the above mentioned SMACNA guideline or those outlined by ASRHRAE 62.1-2007 Section 7: Construction & Startup, whichever is more stringent.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 QUALITY ASSURANCE

A. Inspection: Contractor shall conduct inspections to confirm that construction IAQ measures proposed in the Construction IAQ Plan are being followed, and be prepared to report compliance with the Plan at progress meetings.

3.02 PROJECT CONDITIONS

A. Air Filtration:
1. Systems designed with particle filters shall not be operated without filters in place. Temporary construction filters shall have a minimum MERV rating of 8.
2. Replace all air filtration media immediately prior to occupancy. Post-construction air filters shall have a minimum MERV rating of 11.

B. Construction Ventilation: Following building enclosure, maintain continuous temporary ventilation of areas during installation of VOC-Emitting Materials identified in paragraph 1.04 of this Section. Construction Ventilation shall be provided for post-occupancy touch-up work involving VOC-Emitting materials. It is not required during Building Flush-Out.
   1. Ventilation shall be supplied via open windows and doors, temporary ducts, and temporary fans, sufficient to provide no less than three (3) air changes per hour.
   2. When continuous ventilation is not practical via temporary fans and exhaust to outside, then ventilation shall be supplied via the building's HVAC system and shall comply with the following requirements:
      a. Provide temporary air filters at return air grilles. Minimum MERV 8 efficiency.
      b. Provide 100% outside air. Relative humidity not to exceed 60%.
      c. Provide a minimum of three (3) air changes per hour.
   3. Maintain continuous ventilation for a minimum period of 72 hours after installation of VOC-Emitting Materials, unless otherwise indicated elsewhere in these Specifications.
   4. Ventilate areas directly to outside; ventilation to other enclosed areas is not acceptable.

C. Preconditioning: Prior to installation, allow contractor-furnished contractor-installed VOC-Emitting Furnishings and Equipment as identified in paragraph 1.03 of this Section to off-gas in dry, well-ventilated space for 14 calendar days to allow for reasonable dissipation of odors and emissions.
   1. Remove containers and packaging to maximize off-gassing of VOCs.
   2. Precondition products in ventilated warehouse or other ventilated building. Preconditioning at the project site is acceptable, provided that Temporary Construction Ventilation and Sequencing measures are taken as described elsewhere in this Specification.
   3. Products requiring preconditioning include, at minimum, contractor-furnished and contractor-installed VOC-Emitting Furnishings and Equipment that contain vinyl or other flexible plastics, resins, adhesives, foam rubber, and fiberboards with urea-formaldehyde binders. Products bearing Greenguard certification (www.greenguard.org) shall be excluded from the preconditioning requirement.

3.03 SEQUENCING

A. On-Site Application: Where VOC-Emitting Materials as identified in paragraph 1.03 of this Specification are applied on-site, apply prior to installation of Porous and Fibrous Materials as identified in paragraph 1.03-B of this Specification. Maintain continuous ventilation for a period of 72 hours before installation of porous and fibrous materials.
   1. Where this sequencing requirement is not possible, protect porous materials with polyethylene vapor retarders. Tape all polyethylene edges to insure a complete seal. Maintain continuous ventilation per temporary construction ventilation requirements described above for a period of 72 hours before removing polyethylene.

B. Completion: Complete interior finish material installation prior to Building Flush-Out as described in paragraph 3.06 of this Section.

3.04 PROTECTION

A. Moisture Protection: Protect interior materials from water intrusion or penetration as described in Section 01 60 00 Product Requirements.
   1. Porous or fibrous materials with visible microbial growth shall not be installed.
   2. Non-porous materials with visible microbial growth shall be decontaminated.

B. Duct Protection: during dust-producing activities (e.g. sanding, cutting, or grinding), or when VOC-Emitting Materials (as described in paragraph 1.04 above) are being installed, implement the following measures:
   1. If possible, damper off the return (negative pressure) side of HVAC air distribution system and seal return system openings with polyethylene sheet.
   2. If HVAC system must be operated during dust-producing activities, provide temporary construction air filters with a minimum MERV rating of 8 at all return air grilles.
   3. If HVAC supply air is off, protect diffusers and openings with polyethylene sheet.

3.05 CLEANING

A. Provide the following cleaning in addition to requirements described in Section 01 70 00 Execution Requirements:
   1. Clean all coils, air filters, and fans prior to Testing and Balancing.
   2. If significant dust collection is observed at diffusers, return air grilles, or in ducts, clean prior to system start-up.
   3. Duct cleaning, oil film on sheet metal shall be removed before shipment to site. On-site, inspect ducts to confirm that no oil film is present. Remove any oil. If ducts contain dust and dirt, clean them immediately, prior to substantial completion and prior to using the ducts to circulate air.

3.06 BUILDING FLUSH-OUT

A. Just prior to Substantial Completion, but following Testing and Balancing, flush out building using the building HVAC system, maintaining a minimum temperature of 60° F, a maximum temperature of 80° F and maximum 60% relative humidity as follows:
   1. Provide continuous 24 hour ventilation with all air handling unit dampers at their maximum outdoor air position and all supply fans at their maximum position and maximum rate for at least 14 days.
   2. Following building occupancy, if touch up work involving products with chemical emissions is required, provide temporary construction ventilation during application and following flush out requirements above for a minimum of 4 days after touch up application.
   3. During occupancy, in the event that the schedule does not permit a 14 day flush-out prior to occupancy, the contractor must conduct the flush out while the building is occupied. Prior to occupancy the contractor must comply with all measures to protect building occupants outlined in CHPS, 2009 Credit EQ2.0A.P2.

B. Insure that MERV 11 air filters are in place during Building Flush-Out.

C. Installation of furniture and equipment may occur during Building Flush-Out.

D. Return ventilation system to normal operation following Building Flush-Out period to minimize energy consumption.

E. Immediately following Building Flush-Out, replace air filters with new MERV 11 air filters.

END OF SECTION

APPENDIX A

CONSTRUCTION INDOOR AIR QUALITY (IAQ) PLAN

CONTRACTOR [CONSTRUCTION MANAGER]:

Name: _____ Title: _____

Telephone: _____ Fax: _____

Email: _____

I have read and understood and will implement the following Construction IAQ Plan:

Signature: _____ Date: _____

I. CONSTRUCTION VENTILATION

List all project materials requiring Construction Ventilation per Specification Section 01 81 19. Attach additional sheet if necessary.	
Y / N	Ventilation will be supplied via open windows, temporary ducts, and temporary fans. If "Y", then supply air diffusers, return air grilles, and/or open ducts will be sealed.
Y / N	Ventilation will be supplied via area exhaust fans. If "Y", check applicable: ☐ Supply air diffusers, return air grilles, and/or open ducts will be sealed. Make-up air will be provided through open windows or doors or other transfer air devices. ☐ HVAC system will provide make-up air. Return air grilles will be sealed.
Y / N	Ventilation will be supplied via building's HVAC system. If "Y", check applicable: ☐ Return air grilles are sealed. Exhaust is provided via open windows or doors. ☐ Return air grilles are used for exhaust. HVAC will provide 100% outside air. Air filters with a minimum MERV rating of 8 will be provided at return air grilles.
☐ Required	Areas will be ventilated directly to outside. No ventilated air will be returned.
☐ Required	Ventilation will provide no less than three air changes per hour.
☐ Required	Ventilation will be continuous for a period no less than 72 hours after completion of installation.
☐ Required	All filtration used during Construction Ventilation will be replaced prior to Substantial Completion.

II. PRECONDITIONING

List all project materials requiring Preconditioning per Specification Section 01 81 19. Attach additional sheet if necessary.

Y / N	Preconditioning will occur in dry and well-ventilated offsite location. If "Y": Where is the offsite location? _____
Y / N	Preconditioning will occur onsite. If "Y", check applicable: ☐ Ventilation will be supplied via open windows, temporary ducts, and temporary fans. See I.2a above. ☐ Ventilation will be supplied via area exhaust fans. See I.2b above. ☐ Ventilation will be supplied via building's HVAC system. See I.2c above.
☐ Required	Containers and packaging will be removed prior to Preconditioning.
☐ Required	Preconditioning will occur for fourteen (14) continuous days prior to installation.

III. SEQUENCING

List all project materials requiring Sequencing consideration per Specification Section 01 81 19. Attach additional sheet if necessary.	
☐ Required	Previously installed Porous or Fibrous Materials located in a room where VOC-Emitting Materials are to be installed will be protected with polyethylene vapor retarder. Polyethylene will not be removed until completion of a 72-hour ventilation period.
☐ Required	Installation of interior finish materials will complete fourteen (14) days prior to Substantial Completion.

IV. PROTECTION

List all project materials requiring Protection per Specification Section 01 81 19. Attach additional sheet if necessary.	
☐ Required	Porous or Fibrous Materials with visible microbial growth shall not be installed.
☐ Required	Materials that are not defined as Porous or Fibrous with visible microbial growth shall be decontaminated prior to installation.
☐ Required	Temporary ventilation will be provided during all dust producing activities. See Item I Construction Ventilation above. All supply air diffusers and return air grilles will be covered.
☐ Required	Ducts will be sealed during transportation, delivery, and construction.

END of APPENDIX A

SECTION 01 91 14

O&M TRAINING REVIEW

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Section 01 31 00 Project Management and Coordination.

B. Division 23 Heating, Ventilating and Air Conditioning.

C. Division 25 Building Automation System/Controls.

D. Division 26 Electrical.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 TRAINING OF OWNER PERSONNEL

A. The CONTRACTOR is responsible for training coordination and scheduling and ultimately for ensuring that training is completed.

B. The Commissioning Provider shall be responsible for overseeing and approving the content and adequacy of the training of FACILITIES personnel for commissioned equipment.

1. The CP shall interview FACILITIES personnel to determine the special needs and areas where training will be most valuable. The OWNER'S REPRESENTATIVE and CP shall decide how rigorous the training should be for each piece of commissioned equipment. The CP shall communicate the results to the CONTRACTOR and subcontractors who have training responsibilities.
2. In addition to these general requirements, specific training requirements are specified in 01 77 19.
3. Each contractor responsible for training will submit a written training plan to the CP for review and approval prior to training. The CP will provide a template form for this purpose.
4. The CP develops an overall training scope for commissioned equipment and coordinates and schedules with the CONTRACTOR. The CP develops criteria for determining that the training was satisfactorily completed, including attending some of the training. The CP recommends approval of the training to the ENGINEER using a standard form.

C. The controls contractor shall provide operating manuals, training to maintenance and operation personnel. Refer to section Division 25 Section “Building Automation System/Controls”.

END OF SECTION

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SECTION 02 01 00

SUBSURFACE EXPLORATION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Soil and subsurface investigations may have been conducted in the past at the site by an independent testing laboratory and a log of borings prepared.

B. The report is obtained only for the Owner's use in foundation and parking area design and is not a part of the Contract Documents. The report and log of borings are available for the Contractor's information, but is not a warranty of the subsurface conditions. The Contractor may use a report at his own risk.

C. The Owner does not assume responsibility for variations in kind, depth, quantity and conditions of soils. The Owner disclaims responsibility for accuracy, true location, and extent of soils investigation that has been prepared by others; and it further disclaims responsibility for interpretation of that data by the Contractor as in projecting soil bearing values, rack profiles, soil stability, and presence, level and extent of underground water.

D. The Contractor should visit the site and acquaint himself with site conditions. Prior to bidding, the Contractor may make, at his expense, his own subsurface investigation to satisfy himself with site and subsurface conditions. The Contractor shall obtain authorization of the Owner prior to start of borings or subsurface investigations.

E. The Owner may retain a Soils Engineer to observe the performance of all work related to preparation, filling and compacting of soils under this Section or required by the Contract Documents. If, in the opinion of the Soils Engineer, any work performed under this Section does not meet the technical or design requirements stipulated for the work, make all necessary readjustments to his approval. No deviations from the Contract Documents shall be made without specific and written approval of the Soils Engineer or the Owner.

F. The Soils Engineer's review of the Contractor's performance does not include review of the Contractor's safety measures in, on, or near the jobsite or connected in any way with the performance of the work of this Section.

END OF SECTION

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SECTION 02 01 10

EXISTING TREES TO REMAIN

PART 1 - GENERAL

1.01 SCOPE

A. Work included; Provide protection of all existing trees indicated as shown to remain on the plan.

B. Confirm location of all plant materials designated on Drawings as "Existing" to remain.

C. Contractor shall be responsible for the protection of all existing trees. Provide all barricades as required to prevent damage to existing trees to remain, including but limited to protection from mechanical damage, and soil compaction, pollution from all sources, and disruption of environmental support which would result in the loss of vigor existing trees.

D. Do not operate or park equipment within the drip line of existing trees to remain.

Do not permit machine excavation within the drip line of existing trees to remain. Do not permit more than two (2) inches of existing soil to be removed within the drip line except authorized in writing by the owner.

Do not permit stockpiling of soil within the drip line of all existing trees or more than three (3) inches of fill to be placed within the drip line during grading operations without written acceptance by the Owner.

1.02 INSPECTIONS

A. The project Landscape Architect will perform monthly site inspections to review and monitor the condition and health of the existing trees to remain on the project. A report on the findings of the inspection will be submitted to the Contractor outlining all items needing correction.

1.03 REPAIR OF DAMAGED MATERTIAL

A. During the course of construction, if roots two inches (2) or larger in diameter are cut, the Contractor shall take the following immediate action to minimize further damage to the tree:

1. Stop construction activity, inform project Inspector and landscape Architect to contact a qualified Arborist for inspection. The expense for the Arborist's services shall be at the Constrictor's responsibility.
2. If the Arborist determines that damage occurred, the Contractor will be directed within forty-eight (48) hours to perform the following:
   a) Prune tree to I.S.A. specifications to compensate for root loss.
   b) Aerate soil to relieve compaction and to improve oxygen exchange to root system.
   c) Fertilize trees with deep water bore at rate of one pound of actual nitrogen per 1000 sa. ft.
   d) Inject plant hormones (growth stimulator) through irrigation system.
3. The Owner reserves the right to hire a person to perform the repair work in the event the Contractor does not respond in a time manner. The expense for the work will be billed to the Contractor at no future expense to the Owner.

END OF SECTION

SECTION 02 30 15

SUBSURFACE UTILITY INVESTIGATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes investigation and identification of location of overhead, surface, and underground utilities by the Contractor using firm specializing in underground utility verification

B. Related Sections:
   1. Division 31: Earthwork.
   2. Division 20, 21 and 22: General Mechanical Provisions (plumbing, hydronic & fire protection systems).
   3. Section 26 05 00: Common Work Results for Electrical.

PART 2 - PRODUCTS

2.01 UTILITY VERIFICATION COMPANIES

A. Use utility verification firm specializing in underground utility location.
   1. Off-site utility verification: Underground Service Alert (USA), 800/642-2444.

PART 3 - EXECUTION

3.01 INVESTIGATION

A. Prior to demolition, trenching, and earthwork operations, identify location, routing, and elevation of known and suspected underground utilities in the construction area and along utility trench routings with the Owner. Locate utilities serving and passing to through or from adjacent buildings that need to stay operational. Mark planned locations and routes for new utilities and allow Owner a minimum of 2 working days to locate and mark locations of known or suspected utilities prior to beginning trenching and excavation.

B. Verify existing utilities with the service providers (i.e., power, gas, telephone, water, sewer, cable TV, etc.) to the point of connection on site (meter, transformer, etc.)

C. Locate underground utilities using electronic detection when available, utility map analysis, on-site survey and pot-holing with hand tools or specialized equipment that will avoid damage to existing utilities.

D. Underground utilities include but are not limited to gas, water, sewer, leach fields, septic tanks, storm drain, electrical power and signals (fire alarm, telephone, computer, intercom, data), and sprinkler irrigation and controls.

E. Where non-metallic utilities such as storm drain lines are in the work site, snake metallic trace lines through the line prior to electronic detection.

3.02 IDENTIFICATION

A. Identify underground utilities by stakes, flags, and painted lines.

B. Document the invert elevation of all cleanouts, manholes, and drainage structures.

C. Maintain staking and making of such utilities throughout the duration of the Work.

3.03 COORDINATION

A. Coordinate the proposed routing and elevation of pipes, conduits, and trenches that are part of the Work with existing utilities.

B. Coordinate the routing and elevation of new underground utilities with existing underground utilities. Notify the Architect immediately of any conflicts, prior to proceeding with demolition, trenching, or earthwork operations.

C. Identify active utilities that require relocation and coordinate re-routing paths and new points of connection.

3.04 SITE CONDITIONS

A. Where existing utilities are indicated on the drawings, or marked on site by District or USA personnel, extreme care shall be exercised in excavating near these utilities to avoid damage, and the Contractor will be held responsible for any damage caused by construction operations.

B. Should utilities not indicated on the drawings be found during construction, the Contractor shall promptly notify the Architect for instructions as to further action. Failure to do so will make the Contractor liable for any damage arising from construction operations after discovery of these utilities.

3.05 UNFORSEEN CONDITONS

A. Utilities and obstructions not traceable or noted on the Drawings will be considered unforeseen. Should such lines be encountered and damaged, the Contractor shall repair such condition immediately. The cost of repairs will be compensated to the Contractor on a time-and-materials basis by change order.

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of site, utilities, building finishes or structure.
   2. Salvage of existing items to be reused or recycled.

B. Related Sections include the following:
   1. Division 01 Section "Summary" for use of premises and Owner-occupancy requirements.
   2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
   3. Division 01 Section "Cutting and Patching" for cutting and patching procedures.

1.02 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled. Coordinate disconnection, capping and rerouting of utilities that run to, from and through item or building being removed.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse (including cleaning), and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.03 SUBMITTALS

A. General: Submit each item in this article according to the conditions of the contract and Division 01 Specification Sections, for information only, unless otherwise noted.
   1. Proposed dust control measures.
   2. Proposed noise control measures.

B. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted. Coordinate requirements for hazardous materials removal as specified by District's separate consultant and make allowances in schedule.
   2. Interruption of utility services including fire alarm systems. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Locations of proposed dust- and noise-control temporary partitions and means of egress.
   5. Coordination of Owner's continuing occupancy of portions of existing building and site, and of Owner's partial occupancy of completed Work.
   6. Means of protection for items to remain and items in path of waste removal from building.

C. Inventory: After selective demolition is complete, submit the following:
   1. An inventory of items that have been removed and salvaged.
   2. An inventory of items to be removed by the Owner.
   3. Photographs or video tape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be construed as damage caused by selective demolition operations.

1.04 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI A10.6 and NFPA 241.

E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.05 PROJECT CONDITIONS

A. Owner will occupy portions of site or buildings immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
   1. Comply with requirements specified in Division 01 Section "Summary."

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical except that Owner will remove furnishings and similar items not intended for demolition/removal by contractor prior to start of demolition operations, with ten days' notice to Owner.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.06 LIMITATION OF DEMOLITION

A. Follow instructions for demolition as detailed or described on the drawings. Do not cut or alter any structural element of any building unless it has been specifically detailed in the drawings or has been approved in a Change Order form, having the appropriate and necessary approvals.

PART 2 - PRODUCTS

2.01 REPAIR MATERIALS

A. Use repair materials identical to existing materials.
   1. Where identical materials are not available or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that utilities associated with areas of work have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
   2. Arrange to shut off indicated utilities with utility companies.
   3. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   4. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
      a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.
   5. Provide not less than 48 hours notice to Owner if shutdown of service is required during changeovers.
   6. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.03 GENERAL

A. In company with the Owner and Architect, visit the site and verify the extent and location of selective demolition required.
   1. Carefully identify limits of selective demolition.
   2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.

B. Prepare and follow an organized plan for demolition and removal of items.

1. Shut off, cap, and otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.
2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid, and ready to receive new materials specified elsewhere.
   In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.

3.04 PREPARATION

A. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
   1. Erect temporary protection as necessary or required – refer to another Division 01 Specification Section for temporary controls.
   2. Protect existing site improvements, appurtenances, and landscaping to remain.
   3. Provide temporary weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structure or interior areas.
   4. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
   5. Protect and cover furniture, furnishings, and equipment that have not been removed.

B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.
   2. Design and suitability of showing is the Contractor's responsibility.

3.05 REPLACEMENTS

A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Architect and at no additional cost to the Owner.

3.06 POLLUTION CONTROLS

A. Air Pollution Control District notification may be required for this renovation work. Contractor shall be responsible to make application to the San Joaquin Air Pollution Control District for appropriate permit, schedule for the 10 day

waiting period, pay for all permits and incorporate a demolition plan that adheres to all regulations.

B. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.

D. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

3.07 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   4. Maintain adequate ventilation when using cutting torches.
   5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage. Provide Owner with the location where items are stored.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.08 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Roofing: Refer to Division 07 roofing Sections for roof patching requirements.

D. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.09 PATCHING AND REPAIR

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

B. Patching is specified in Division 01 "Cutting and Patching."

3.10 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Comply with applicable requirements and procedures in Division 01 Section "Construction Waste Management" and "Construction Indoor Air Quality."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.11 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
1. Buildings shall be broom clean upon completion of selective demolition.

B. Change filters on air-handling equipment on completion of selective demolition operations.

3.12 SELECTIVE DEMOLITION SCHEDULE: Scope of Demolition work is indicated in drawings.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

E. Related Sections
1. Section 03 20 00 Concrete Reinforcement.
2. Section 03 30 00 Cast-In Place Concrete.
3. Section 03 39 00 Concrete Curing.

1.02 REFERENCES

A. ACI 318-11 Building Code Requirements for Structural Concrete.

B. ACI 117 - Standard Tolerances for Concrete Construction and Materials.

C. ACI 347R -11 Guide for Shoring/Reshoring of Concrete Multistory Buildings.

D. PS-1 - Construction and Industrial Plywood.

E. California Code of Regulations, Title 8 Subchapter 4. Construction Safety Orders, Article 29, Erection and Construction, Section 1717.

F. Chapter 19, 2013 California Building Code.

G. APA - American Plywood Association Design and Construction Guide.

H. Local AQMD - Air Quality Management District.

1.03 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to ACI 318, Section 6.1. Resultant concrete to conform to required shape, line and dimension. Design of formwork is Contractor's responsibility.

B. The formwork shall be designed for the loads and lateral pressures outlined in Chapter 2 of ACI 347R, and lateral forces as specified by the CBC.

C. Forms for elevated concrete and walls exceeding 4 ft. in height shall be designed by a professional Civil or Structural engineer registered in the State of California.

D. Foundation concrete may be placed directly into neat excavations, provided foundation trench walls are sufficiently stable. In such case, minimum formwork is mandatory to insure clean excavations and properly formed surfaces immediately prior to and during placing of concrete.

1.04 COORDINATION

A. Coordinate this Section with other Sections of work that require attachment of components to formwork.

B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, Contractor shall adjust reinforcement positioning to accomplish required cover or otherwise request instructions from Architect before proceeding.

1.05 SUBMITTALS

A. Submit specification for type of form material to use for each formed surface.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Plywood: APA - MDO (Medium Density Overlay) Plyform, Group 1, Exterior, PS-1, for exposed surfaces. APA - BB (No-overlay) Plyform, Class 1, Exterior, PS-1 for unexposed surfaces [APA - HDO (High Density Overlay) Plyform, Class 1, Exterior, PS-1 for smoothest glossy concrete finish].

B. Tubular [Column] Forms: fiber-reinforced, spirally wound, paperboard forms with integral form-release liner, seamless, Sonotube by Sonoco, Hartsville, SC, or equal, approved in accordance with Division 01, General Requirements, for substitutions.

C. Lumber: Douglas Fir species; construction grade with grade stamp clearly visible.

2.02 FORMWORK ACCESSORIES

A. Form Release Agent: Colorless non-staining liquid chemical agent, free of wax or oils which will not absorb water. Material shall comply with AQMD, Local Regulations.

B. Corners: Chamfered type; maximum possible lengths.

C. Under-slab Vapor Barrier: See specification section 03 30 00, Cast-in-Place Concrete.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.

3.02 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements in accordance with requirements of ACI 318, Section 6.1.
   1. Where public areas such as sidewalks and streets are to be shored, drawings and calculations are to be submitted by Contractor to the city or governing agency for approval prior to beginning of any work.
   2. Contractor and/or his engineer assume and accept all responsibility for construction and safety of formwork and shoring. Utilize trapeze assemblies for supporting formwork at curbs utilizing bearing plates that will not puncture vapor barrier below slabs. Seal vapor barrier per manufacturer's recommendations at unavoidable penetrations.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads. Take care not to puncture below-slab vapor barrier by utilizing carriers that bridge or cantilever over footing trenches and incorporate supports that will not puncture vapor barrier.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shoring. Conform to Title 8, Subchapter 4, Construction Safety Orders, CCR.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on Drawings.

F. Provide chamfer strips on external corners of exposed to view concrete per Architect's direction.

G. Surface irregularities, ACI 347R Class A, gradual or abrupt irregularities of 1/8 inch for exposed to view concrete. Class B, 1/4 inch for plaster cement finish.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work. No openings or embedded items permitted in structural slabs within 18 inches of columns. Conform to Section 1906A, California Building Code.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors and other inserts, whether indicated on the structural drawings or not.

D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean and remove foreign matter within forms as erection proceeds.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117.

3.08 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design and that supports, fastenings, wedges, ties and items are secure.

3.09 FORM REMOVAL

A. Upon completion of Work, formwork and shoring materials are to be removed from site at expense of Contractor. Certain steel and/or concrete materials may be left in place with written approval of Architect.

B. Removal of formed shores shall comply with ACI 318, Section 6.2.

C. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
   1. Minimum stripping time for edges of slabs: 3 days.

D. Loosen forms carefully. Do not wedge pry bars, hammers or tools against finish concrete surfaces scheduled for exposure to view. Do not break-off corners.

E. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms. Re-shoring permitted only after 10 days from stripping.

3.10 BLEMISH AND ALIGNMENT CORRECTION

A. Where honey comb rock pockets and other blemishes occur in exposed-to-view surfaces, provide suitable repair by filling, sacking and patching as

directed by Architect for a stable repair that is uniform in appearance to match non-repaired surfaces.

B. Where concrete curb and footing faces are misaligned with the wall finishes above, remove and/or fill the wall face to achieve straight alignment using methods approved by the structural engineer and architect for a stable repair that is smooth and even in appearance that matches adjacent concrete.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fabricating and setting reinforcing steel and accessories for building and site cast-in-place concrete.

B. Related Sections
1. Section 03 10 00, Concrete Formwork
2. Section 03 30 00, Cast-in-Place Concrete
3. Section 32 13 13, Site Concrete Improvements

1.02 REFERENCES

A. ACI 315 - Details and Detailing of Concrete Reinforcing.

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

C. ASTM A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

D. AWS D1.4 - Structural Welding Code for Reinforcing Steel.

E. CRSI - Concrete Reinforcing Steel Institute Manual of Practice.

F. Chapter 19, 2013 California Building Code.

1.03 SUBMITTALS

A. Shop Drawings, indicating bar sizes, spacings, locations, lap lengths and quantities of reinforcing steel.

1.04 QUALITY ASSURANCE

A. Provide Mill certificates for reinforcing steel identification or otherwise perform appropriate laboratory testing for identification of materials.

B. Comply with the requirements of Division 01 General Requirements.

1.05 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work requiring attachment, embedment or penetration of the formed area.

PART 2 - PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, deformed billet steel bars, in grades as follows, and conforming to ACI 318, Section 3.5.
   1. For No.4 and larger bars, use 60 ksi yield grade.
   2. For ties and stirrups, and No. 3 and smaller bars, use 40 ksi yield grade.

B. Welded Wire Reinforcement: Plain type, ASTM A185; in flat sheets; uncoated finish, 6 x 6 - W4.0 x W4.0 unless otherwise noted on drawings.

C. Welded Reinforcement: Reinforcing steel shall not be welded unless specifically detailed. Welded reinforcement shall be ASTM A706.

D. Welding Electrodes: Low Hydrogen grade E70XX for Grade 40, E90XX for ASTM A706.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gauge black annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

D. Concrete Blocks: Approximately 3 inches dimension each side.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice and ACI 315 and ACI 318. Wherever possible, make bends to shape in fabricator's shop.
   1. Bars reduced in section will not be accepted.
   2. Bars with kinks are unacceptable.
   3. Bars shall not be heated to facilitate bending or for any other purpose.
   4. Bars with bends not indicated on drawings will not be accepted. Perform no forming in a manner which will damage bars.
   5. Rebending of bars prohibited. One shop or field bend is allowed.

B. Welding of reinforcement is not allowed unless specifically detailed.

C. Locate reinforcing splices not indicated on Drawings at point of minimum stress.

PART 3 - EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Install concrete blocks to support reinforcement over grade. Rocks not permitted.

B. Do not displace or damage vapor barrier where vapor barrier is specified or indicated on drawings.

C. Accommodate placement of formed openings.

D. Prior to placing, thoroughly clean reinforcement of all rust, dirt, dust, oil or any other material deleterious to bonding of concrete.

E. Accurately place and securely tie reinforcement at all intersections and splices with black annealed wire and securely hold in position during placing of concrete by means of precast concrete block supports. Point wire tie ends away from the form. Unless otherwise indicated, the number, type, and spacing of supports shall conform to the ACI 315.

F. Anchors and Dowels: Securely tie in place prior to placing of concrete. Do not place dowels in concrete after pour.

G. Unless a greater cover is required on the drawings, provide minimum concrete cover in conformance with ACI 318, Section 7.7.1.

END OF SECTION

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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete.

B. Concrete curbs for walls, floors, slabs on grade and footings.

C. Concrete fill/toppings at recessed slabs (including where tile mortar beds are removed).

D. Concrete fill for slabs over steel decking and treads at metal pan stairs.

E. Control, expansion and contraction joint devices associated with concrete work including joint sealants.

F. Related Sections:
1. Section 03 10 00, Concrete Formwork
2. Section 03 20 00, Concrete Reinforcement
3. Section 03 39 00, Concrete Curing
4. Section 07 25 00, Concrete Slab Vapor Emissions Treatment
5. Section 32 13 13, Site Concrete Improvements

1.02 REFERENCES

A. CBC - 2013 California Building Code
1. CBC-19 – CBC Chapter 19A, Concrete

B. ADA – Americans with Disabilities Act of 2010
1. ADA/Standards – ADA Title II Regulations and the DOJ/Standards for Accessible Design

C. CACRM - California Access Compliance Reference Manual, updated based on the 2013 California Building Code.

D. ACI 301 - Structural Concrete for Buildings and ACI 303.1 – Standard Specification for Cast-In-Place Architectural Concrete.

E. ACI 318-11 - Building Code Requirements for Structural Concrete and Commentary.

F. ASTM C33 - Concrete Aggregate.

G. ASTM C150 - Portland Cement.

H. ASTM C171 - Sheet Materials for Curing Concrete.

I. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete

J. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.

K. ASTM C979 – Standard Specification for Pigments for Integrally Colored Concrete.

L. ASTM C1107 - Packaged Dry, Hydraulic - Cement Grout (Nonshrink).

M. ASTM C1116 – Specification for Fiber-Reinforced Concrete.

N. ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Bituminous Type).

O. ASTM E96 - Water Vapor Transmission of Materials.

P. CSS - Caltrans Standard Specifications, Latest Edition.

1.03 SUBMITTALS

A. Placement Schedule: Submit for approval details and/or sketches showing location of each proposed construction joint. Do not deviate from locations of horizontal joints indicated on drawings.

B. Product data for each type of manufactured material and product included.

C. Design mix for each concrete mix. Separate design for integrally colored concrete. Refer to Structural Drawings for mix design limitations.

D. Submit contraction (crack control) joint, expansion, isolation and construction joint layout to Architect for approval.

1.04 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded utilities and components that are concealed from view.

B. Maintain an accurate record showing date and time of concrete placement in each portion of structure.

C. Correlate placing record for test cylinders made by testing laboratory.

D. Maintain a separate record giving date of removal of forms, shoring, including first and second halves and reshoring, if used.

E. Keep all records available for inspection at site. Upon completion of concrete work, deliver two copies of each to Architect in approved form.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with Section 1905, 2013 California Building Code, and ACI 318-11.

B. Maintain one copy of all records.

C. Acquire cement and aggregate from same source for all work.

D. Conform to ACI 318, Section 5.13 California Building Code, when concreting during hot weather. No concrete placement permitted above 90 degrees Fahrenheit.

E. Conform to ACI 318, Section 5.12, California Building Code, when concreting during cold weather. No concrete placement permitted below 50 degrees Fahrenheit.

1.06 COORDINATION

A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

B. Hold pre-construction meeting at least one week prior to placement of integrally colored concrete to discuss the project and application of materials.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150, Type II. Portland Cement Type, conforming to ACI 318, Section 3.2.

B. Aggregates:
1. Aggregate for Stone Concrete: ASTM C33.
2. Aggregate for Lightweight Concrete: ASTM C330.

C. Conform to requirements on structural drawings for maximum size of aggregate permitted in individual applications. Do not exceed the maximum size specified in ACI 318, Section 3.3.2.

D. Water: Clear, from potable source, and not detrimental to concrete conforming to ASTM C1602.

E. Flyash: ASTM C618, Class N or F (Class C is not permitted).

2.02 ACCESSORIES

A. Bonding Agent: ASTM C631, Polyvinyl Acetate Latex emulsion; HIBOND, manufactured by Lambert Corporation, Orlando FL, LOCK BOND NO. 906, manufactured by Macklanburg-Duncan Co., City of Industry, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

B. Curing Film: See Specification Section 03 39 00.

C. Non-Shrink Grout: ASTM C1107, Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency suitable for application and a 30 minute working time.

D. Vapor Barrier: ASTM E 1745 and ASTM F 1249 Class A, 15 mils thick, Permeance as tested before and after mandatory conditioning (ASTM E 1745 Section 7.1 and sub-paragraphs 7.1.1 – 7.1.5): less than 0.01 grains/(ft² · hr · inHg), tensile strength not less than 45 lbf/in., 2200 grams minimum puncture resistance.
   1. Acceptable Products
      a. 15 mil Stegowrap Vapor Barrier, Stego Industries LLC
      b. Reef Industries, VaporGuard
      c. Or equal, as approved in accordance with Division 01 requirements for Substitutions and complying with tested permeance under 0.01 grains.
   2. Provide edge sealing tape flexible sealants and other accessories as recommended by manufacturer for avoidance of below slab moisture transmittance.

E. Reinforcement: In accordance with Section 03 20 00.

F. Concrete Formwork: In accordance with Section 03 10 00.

G. Vapor Emission Treatment Systems: In accordance with Section 07 25 00. Do not use for curing compound.

H. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8" to 3/8" and that can be feathered at edges to match adjacent floor elevations. Products by Tile-Tex by Flintkote Co., Webtex #60 or Fixallatex by Dowman Products Co or equal. Do not use for 4exposed to view concrete.

I. Waterstops: Flexible PVC type, factory-installed metal eyelets for embedding in concrete to prevent passage of fluids through joints, factory-fabricated corners, intersections and directional changes. Serrated or dumbbell with center bulb for expansion joints, 6 inches, 1/4 inch thick, unless noted otherwise on

drawings. By Greenstreak, Inc. St. Louis, Missouri, BoMetals Inc. Powder Springs, GA or equal.

2.03 JOINT DEVICES AND FILLER MATERIALS

A. Expansion Joint Filler - ASTM D1751: Closed cell bituminous saturated fiberboard, 1/2 inch thick; Fiber Expansion Joint manufactured by American Highway Technology, Kankakee, IL, W. R. Meadows, or approved equal.

B. Expansion Joint Top: Integral extruded polystyrene plastic; 1/2 inch thick, with removable top strip exposing sealant trough, JOINT CAPS manufactured by The Burke Company, or equal as approved in accordance with Division 01, General Requirements for substitutions.

C. Joint Backing: ASTM C1330, Cylindrical, Type C, closed cell, polyethylene backer rod; oversized 30 to 50 percent larger than joint width. Green Rod by Nomaco Inc. or equal.

D. Sealant: Polyurethane multi-component type, non-sagging or self leveling at flatwork, as specified in Section 07 92 00.

E. Primer: As recommended by sealant manufacturer.

F. Saw-Cut Joint Filler: Two-component epoxy resin, gray color, non-hardening, self-leveling, SIKADUR 51 (SL), by Sikacorp., Lyndhurst, NJ, or equal as approved in accordance with Division 01 General Requirements for Substitutions. At Diamond Polished slabs, polyurea fillers may be used to suit the polishing process and match the finish color of the slab.

2.04 CONCRETE MIX

A. Mix and deliver concrete in accordance with Chapter 5, ACI 318. Deliver concrete in transit mixers only. Deposit concrete in accordance with ACI 318, Section 5.10.
   1. Design Mix: ACI 318, Chapter 5. Ingredients and proportions for design mix shall be selected by a DSA -approved Testing Laboratory certified by a registered civil engineer licensed in California.
   2. Required Strength: As noted on the structural and civil drawings. Note that floor slabs on grade and on metal decks will have a different mix design from footings and other structural concrete to help control moisture migration.
   3. Select proportions by volume for concrete in accordance with the approved design mix.
   4. All mix designs for this project shall include a 10% to15% flyash substitute for cement by volume. Refer to Section 2.01 E.
   5. Do not exceed water-cement ratios by weight for concrete items as specified on the structural drawings.

6. Comply with structural drawings for other limitations to each mix design specified.
7. Miscellaneous Sitework Concrete: Specified in Section 32 13 13, Sitework Concrete.

Add colored admixture to integrally colored concrete mix according to manufacturer's written instructions for integrally colored concrete where indicated.

2.05 GROUT MIX

A. 1:3:2 parts Portland Cement, to sand, to pea gravel, for minimum 2000 psi at 28 days.

2.06 DRYPACK

A. Cement/sand mix of consistency to pack dry below base plates and other components as specfieid. Minimum 5,000 psi.

B. Alternate flowable cementitious fill material may be used if properly dammed and consolidated below components. Minimum 5,000 psi.

2.07 GRANULAR FILL

A. Crushed Aggregate Base (below vapor barrier): 3/4 inch maximum grading, crushed rock and rock dust conforming to requirements of Section 200-2.2, SSPWC, with 3/8 inch sieve requirement waived, or Class 2 Aggregate Base as defined in Section 26, CSS.

B. Up to 1 inch of clean sand may be placed over crushed aggregate base for smoothing and leveling prior to placing vapor retarder.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify compaction has been completed per Division 31, Earthwork.

C. Verify requirements for concrete cover over reinforcement.

D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with sandblasting to remove laitance and expose clean aggregate.

B. In locations where new concrete is doweled to existing work, drill and clean holes in existing concrete in accordance with the ICC ESR report specified on the structural drawings for the type of epoxy indicated. All non-structural epoxy dowel applications require IOR inspection during installation. All structural epoxy dowel applications will be subject to "special inspection" may be load tested at Structural Engineer's specification.

C. When approved by the Architect, clean previously placed concrete with steel brush and apply bonding agent in accordance with manufacturer's instructions.

D. Under Interior Slabs on Grade: Install 3 inches thick crushed aggregate base over compacted earth or engineered fill per Section 200-2.2, SSPWC or Class 2 CCS as capillary break to appropriate grade. Up to 1" clean sand may be added over aggregate base for smoothing and leveling prior to placing vapor barrier. Over aggregate base place 15-mil vapor barrier in largest practical sections. Seal all 6-inch lapped seams, penetrations and foundation perimeters using only manufacturer-approved tape or flexible sealant and install per manufacturer instructions. Install pipe boots at pipe penetrations. Install reinforcement and concrete as scheduled.
   1. Installation of vapor barrier shall be in accordance with ASTM E 1643 and manufacturer's instructions.
   2. Tapes, mastics, sealants, and other products used with vapor barrier shall be from same manufacturer as, and certified compatible with, vapor barrier.

E. Install steel reinforcing per Section 03 20 00.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 318, Section 5.10, and per CPAA recommendations at slabs indicated for diamond polishing. Prior to placement remove loose dirt from excavations.

B. Notify Architect and Structural Engineer minimum 24 hours prior to commencement of operations. All excavations, forms and reinforcing shall be inspected and approved by the "special inspector" and Architect or Structural Engineer prior to placement.

C. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and accessories are not disturbed during concrete placement.

D. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.

E. When detailed on the drawings, separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

F. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface using two-component polyurethane sealant as specified in Section 07 92 00.

G. Install joint devices in accordance with manufacturer's instructions as detailed.

H. Install construction joint device in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

I. Maintain joint device in correct position to allow joint cover flush with finish.

J. Install joint covers in longest practical length.

K. Place concrete continuously between predetermined expansion, control and construction joints.
   1. Install expansion joints at vertical concrete walls at 24 feet on center unless noted otherwise on drawings.
   2. Retaining Walls at Buildings: install waterstops in expansion joints to form a continuous waterproofed wall surface condition. Support and protect exposed waterstops during progress of the Work.

L. Do not interrupt successive placement; do not permit cold joints to occur.

M. Avoid segregation of materials. Perform vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.

N. Provide special mix prepared by the Testing Laboratory and approved by the Architect utilizing smaller aggregates in areas of reinforcing congestion to prevent the formation of rock pockets.

O. The unconfined vertical drop of concrete shall not be greater than 5 feet. Do not allow concrete to fall free from any height that will cause materials to segregate. Maximum height of free fall permitted in any case: 5 feet. Utilize trunks or additional chutes where doubt occurs. Conform to requirements of CBC Section 1905A.10.

P. Horizontal Construction Joints: Wash surface of each joint shortly after pouring to expose clean, sound aggregate. Sandblast surface to remove laitance remaining or loose aggregate as approved by the Architect. Conform to Section 1906A, CBC.

Q. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/8 inch in 10 ft. Slope floors for drains.

R. Exterior Slab Contraction Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch, place joints at column lines and at 12 ft. o.c. each way, maximum. Remove groover tool marks on exposed concrete surfaces. Contractor's option: Saw cut joints, early-entry dry-cut, per ACI 302.1R.

S. Interior Slab Contraction Joints: Saw cut slabs where indicated on drawings or as approved by Architect at 12 ft. on center, within 4 hours after placing concrete. Saw cut joints with power saws equipped with shatterproof abrasive diamond-rimmed blades, cut 1/8" wide joint into concrete when cutting action will not tear, abrade, or otherwise damage surface. Cut no deeper than 1/4 depth of slab thickness where slabs are to be covered and 1/3 depth of slab where slabs are to be exposed. Fill cuts with non-hardening epoxy minimum 45 days after pour. Where floors are to be diamond polished provide the joint fillers that are compatible with the polishing procedures. Clean and completely fill cut to surface of slab. Saw cut joints, early-entry dry-cut, per ACI 302.1R.

T. Isolation Joints: preformed joint filler depth of slab, fill top 1/2 inch with elastomeric sealant per Section 07 92 00. Locations: at columns, footings, and as noted on drawings.

U. Steel Pan Stairs (where applicable): Install safety nosings at each tread, all steel pan stairs.

V. Surface irregularities, ACI 347R Class A, gradual or abrupt irregularities of 1/8 inch for exposed to view concrete. Class B, 1/4 inch for plaster cement finish.

3.04 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels, maximum dimension not to exceed 20 ft.

E. Screed toppings level, maintaining surface flatness of maximum 1/8 inch in 10 ft.

F. Concrete Curing – See Section 03 39 00.

3.05 CONCRETE FINISHING

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. At slabs indicated for diamond polishing, comply with recommendations of CPAA, including use of laser screeds for a highly level finish.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
   1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view, indicated for diamond polishing finish, or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with medium fiber-bristle broom perpendicular to main traffic route.

H. Provide formed concrete surfaces to be left exposed with smoother rubbed finish unless otherwise indicated.

3.06 FINISH AT EXPOSED VERTICAL SURFACES

A. Rubbed Finish: Apply the following to Smooth-Formed Finished concrete per ACI 301:
   1. Grout-Cleaned Finish (Sack-rubbed finish): Remove fins, rough spots, stains, and hardened mortar by carefully rubbing with a fine abrasive stone to a smooth even surface. Wet concrete surfaces and apply grout

of a consistency of thick paint to coat surfaces and fill small holes. Mix one part Portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture (colorless) and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3.07 CURING AND PROTECTION

A. In accordance with Section 03 39 00 Concrete Curing. At slabs indicated for diamond polishing, comply with recommendations of CPAA.

3.08 FIELD QUALITY CONTROL

A. Provide free access to Work and cooperate with Architect, DSA and Testing Laboratory.

B. Measure floor and slab flatness and levelness according to ASTM E1155 (ASTM E 1155M) within 72 hours of finishing.

C. Proposed mix design of each class of concrete shall conform to ACI 318, Chapter 5 and shall be approved by the Architect prior to commencement of work.

3.09 PATCHING

A. Architect will inspect concrete surfaces and determine imperfections, if any.

B. Patch imperfections as approved and in accordance with ACI 301.
   1. Clean all exposed concrete surfaces and all adjoining work stained by leakage of concrete. Remove all fins, butts and projections by grinding. Patch voids, rock pockets, holes, cracks and similar imperfections by chipping loose concrete and exposing clean, sound aggregate.
   2. Fill cone form tie recesses with portland cement mortar flush to finish surface.

3.10 DEFECTIVE CONCRETE

A. Defective Concrete: Remove concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect.

C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express approval of Architect for each individual area.

3.11 MOISTURE TEST FOR CONCRETE FLOORS

A. Test and, if required, remediate all interior concrete slabs-on-grade scheduled to receive new moisture sensitive floor finishes in accordance with Section 07 25 00.

END OF SECTION

SECTION 03 39 00

CONCRETE CURING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces, excluding site work concrete.

B. Related Sections:
   1. Section 03 30 00, Cast-In-Place Concrete
   2. Section 07 25 00, Concrete Slab Vapor Emission Treatment

1.02 REFERENCES

A. ACI 318 – Building Code Requirements for Structural Concrete.

B. ACI 301 - Structural Concrete for Buildings.

C. ASTM C171 - Sheet Materials for Curing Concrete.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 318, Section 5.11. Proper curing of concrete shall be the Contractor's responsibility. Improperly cured concrete in the opinion of the Architect shall be removed and replaced at no extra cost to the Owner.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle sheet film materials to avoid puncturing or damage of any kind.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Polyethylene Film ASTM C171; 10 mil thick, clear, manufactured from virgin resin with no scrap or additives, manufactured by Burke By Edoco, Long Beach, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

B. Water: Potable and not detrimental to concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify substrate conditions.

B. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION - HORIZONTAL SURFACES

A. Immediately after placement, protect concrete from soil contamination, premature drying, excessively hot or cold temperatures and mechanical injury.

B. Maintain concrete with minimal moisture loss at above 50 degrees F temperature for period necessary for hydration of cement and hardening of concrete. Dusting with dry cement to absorb excess water is prohibited.

C. Cure floor surfaces only as specified herein and in accordance with Section 1905A.11 CBC. Membrane curing compound method not permitted for interior cast-in-place concrete slabs.

D. Moisture Retaining Coverings: spread polyethylene film over floor slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for minimum of seven (7) days unless noted otherwise on drawings. Do not permit traffic over floor slabs during the seven (7) day curing period. Keep membrane flat without folds or creases at integrally colored concrete and interior slabs indicated to remain exposed.

E. Quality Control: Proper curing of concrete surfaces shall be the responsibility of the Contractor under this section.

F. Flooding, sprinkling or ponding not permitted.

3.03 EXECUTION - VERTICAL SURFACES

A. Spraying: Spray water over surfaces and maintain wet for 10 days.

B. Vertical Surfaces: Fog spray water over surfaces and maintain wet for 10 days.

3.04 PROTECTION OF FINISHED WORK

A. Protect finished Work from damage caused by the work of other sections.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

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SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes furnishing and installing the following for buildings and fences:

1. Concrete masonry precision units as indicated in drawings, with special shapes and score patterns as indicated or required.
2. Concrete masonry fence unit as indicated in drawings including precision with special size, shapes and score patterns as indicated or required.
3. All reinforcement, grout, mortar and accessories.
4. Clear sealer at exposed concrete masonry not indicated for opaque paint or other finishes.

B. Related Sections:

1. Division 3 Section, "Cast-in-Place Concrete"
2. Division 5 Section, "Metal Fabrications"
3. Division 9 Section, "Painting"

1.02 REFERENCES

A. ASTM International (ASTM)

1. ASTM C33 – Standard Specification for Concrete Aggregates.
2. ASTM C90-11b — Standard Specification for Load-Bearing Concrete Masonry Units.
3. ASTM C129 – Standard Specification for Non-Load-Bearing Concrete Masonry Units.
4. ASTM C140-12 – Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
5. ASTM C270-12 – Standard Specification for Mortar for Unit Masonry.
6. ASTM C476-10 – Standard Specification for Grout for Masonry.
7. ASTM C1019 – Standard Test Method for Sampling and Testing Grout.

B. Building Code Requirements and Specification for Masonry Structures:

1. TMS 402-11/ACI 530-11/ASCE 5-11, TMS 602-11/ACI 530.1-11/ASCE 6-11.

C. 2013 California Building Code (CBC)

D. National Concrete Masonry Association (NCMA):

1. NCMA TEK Bulletin #8-2A – Removal of Stains from Concrete Masonry.
2. NCMA TEK Bulletin #8-3A – Control and Removal of Efflorescence.
3. NCMA TEK Bulletin #9-4A – Grouts for Concrete Masonry.
4. NCMA TEK Bulletin #19-4 – Flashing for Concrete Masonry.
5. NCMA TEK Bulletin #3-1B – All-Weather Concrete Masonry Construction.

1.03 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each different masonry unit, accessory, and other manufactured product indicated.

C. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

D. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.

1. Each different cement product required for mortar and grout including name of manufacturer, brand, type, and weight slips at time of delivery.
2. Each material and grade indicated for reinforcing bars.
3. Each type and size of joint reinforcement.

E. Color Selection: For initial selection submit:

1. Unit masonry samples showing full extent of colors and textures available for each type of exposed unit masonry required.
2. Colored mortar samples showing full extent of colors available.

F. Samples: For verification purposes submit:

1. Samples for each style & color specified of exposed masonry unit specified, including full range of color and texture to be expected in completed work.
2. Colored masonry mortar samples for each color required. Show full range of color which can be expected in finished work; label samples to indicate type and amount of colorant used.

G. Material test reports from a qualified independent testing laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:

1. Mortar complying with property requirements of ASTM C 270.
2. Grout mixes. Include description of type and proportions of grout ingredients.
3. Masonry units.

H. Results from tests and inspections performed by Owner's representatives will be reported promptly and in writing to Architect and Contractor.

I. Submit Warranties in accordance with Section 01 78 36.

1.04 QUALITY ASSURANCE

A. All Unit Masonry shall conform to the 2013 edition of the California Building Code (CBC).

B. Unit Masonry Standard: Comply with TMS 402-11 and TMS 602-11, ACI 530-11/ASCE 5-11, ACI 530.1-11/ASCE 6-11 "Specifications for Masonry Structures." Also comply with recommendations in referenced ASTM Standards and NCMA Bulletins where more stringent than ACI and CBC requirements.

C. Inspecting Laboratory Qualifications: To qualify for employment in performing tests and inspection specified in this Section, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM C 1093, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying the progress of the Work.

D. Preconstruction Testing: Owner will employ and pay a qualified independent testing laboratory to perform the following preconstruction testing indicated as well as other inspecting and testing services required by referenced unit masonry standard or indicated herein for source and field quality control:

1. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C 140.
2. Grout compressive strength will be tested per ASTM C 1019.
3. Drying shrinkage testing per ASTM C426-07. Shrinkage test results are not required prior to start of construction, but may be used to determine causes of excessive cracking and/or unacceptable masonry performance.

E. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

F. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry materials to project in undamaged condition.

B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.

C. Store cementitious materials off the ground, under cover, and in dry location.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

1.06 PROJECT CONDITIONS

A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.

C. Cold-Weather Construction: Comply with referenced unit masonry standard for cold-weather construction and the following:

1. Do not lay masonry units that are wet or frozen.
2. Remove masonry damaged by freezing conditions.
3. Comply with CBC, Section 2104.3

D. Hot-Weather Construction: Comply with referenced unit masonry standard for hot-weather construction and the following:
1. Comply with CBC, Section 2104.4.

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

A. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

B. Acceptable manufacturer: Basalite, 1201 Golden State Blvd., Selma, CA 93662, Tel: 559-896-1649, or approved equal.

C. Substitutions will be considered only in accordance with Section 01 25 00, submitted a minimum of 14 days prior to bid submittal date and approved prior to bid.

2.02 CONCRETE MASONRY UNITS

A. General: Comply with requirements indicated below applicable to each form of concrete masonry unit required.

1. Provide special shapes and colors where indicated and as follows:

a. For corners, control joints, bonding, and other special conditions.
b. Square-edged units for outside corners.
c. Textures, patterns and coursing shall be as indicated in drawings.
d. Color to be natural grey for paint finish per Section 09 91 00 unless otherwise indicated. Fence block units to be natural grey with no paint (clear sealer).

2. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.

a. Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.

b. Width x height x length: 8"x8"x16", 8"x8"x8", 8"x4"x16", 6"x8"x16" and other sizes indicated or required including pilaster units, sill blocks, caps and special scored units, as indicated in drawings.

3. Absorption Requirements: Conform to ASTM C 90-03 Table 2.

B. Hollow Load-Bearing Concrete Masonry Units: ASTM C 90, Grade N and as follows:

1. Unit Compressive Strength: Provide units with minimum average net area compressive strength of 1900 psi.

2. Maximum 0.065% linear shrinkage when tested in accordance with CMA standards.
3. Weight Classification: Light weight or Normal weight.

4. Comply with CBC Standards and ACI 530.

2.03 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II low alkali, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce required mortar color. Masonry cement will not be permitted. Maintain cement type throughout project.

B. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

C. Hydrated Lime: ASTM C 207, Type S.

D. Colored Mortar: Use pure mineral oxide mortar color; proportion by weight. Match color of concrete masonry units or as otherwise indicated.

E. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.

F. Aggregate for Grout: ASTM C 404.

G. Water: Clean and potable, free from impurities detrimental to mortar and grout.

H. Admixtures

1. Only with Architect's approval and not adversely affecting bond or compressive strength.
2. Grout Aid: All grout shall contain Sika "Grout Aid" (GA) as manufactured by Sika Chemical Corp. Mix GA as recommended by manufacturer.

I. Comply with CBC, Section 2103.

2.04 REINFORCING STEEL

A. General: Provide reinforcing steel complying with requirements of referenced unit masonry standard and this article, with size and spacing as indicated in drawings.

B. Steel Reinforcing Bars: Material and grade as follows:

1. Billet steel complying with ASTM A 615 – Grade 60 deformed bars.

C. Wire Ties: No. 16 annealed wire for tying reinforcing steel.

D. Wire Ladder reinforcement in horizontal beds of stacked bond units.

2.05 MISCELLANEOUS MASONRY ACCESSORIES

A. Control Joints:

1. At Walls and Fences: Use joint type as detailed. Caulking shall match mortar joint color.
2. At soil retained walls: Where soil occurs use Preformed rubber in profiles required or shown, same as Dur-O-Wal Inc.'s "Rapid Control Joint," or approved substitute.

B. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.06 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned:.

1. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface-acting acids, chelating, and wetting agents.
2. Available Products: Subject to compliance with requirements, a product that may be used to clean unit masonry surfaces includes, but is not limited to, the following:

a. "Sure Klean No. 600 Detergent," ProSoCo, Inc.

2.07 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Type S, Proportion Specification, for types of mortar indicated below:

1. Limit cementitious materials in mortar to Portland cement-lime.
2. Refer to structural drawings for mortar mix proportions. Comply with CBC, Section 2103.9 and TMS 602, Table SC-1.

3. Refer to structural drawings for grout strength requirements. Comply with CBC, Section 2103.13 and TMS 602, Section 2.2.

C. Colored Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.

D. Grout for Unit Masonry: Comply with ASTM C 476 and referenced unit masonry standard.

1. Grout shall be a coarse grout designed to attain a compressive strength of 2000 psi at 28 days.
2. Grout shall be composed of 1 part Portland Cement, not more than 1/10 part hydrated lime fine aggregate at 2 ¾ to 3 times the sum of the volumes of the cementitious materials, and pea gravel at 1 to 2 times the sum of the volumes of the cementitious materials, grout aid and sufficient water to attain a slump between 8 and 10 inches without segregation.
3. Materials for grout shall be measured in suitable calibrated devices. After the addition of water, all materials shall be mixed for at least 3 minutes in a drum type batch mixer. Mixing equipment and procedures shall produce grout with the uniformity required for concrete by ASTM C94.

2.08 SEALER

A. Sealer for masonry not otherwise indicated to be painted, unfinished or receive other finish shall be a clear non-yellowing silicone water repellent. Apply two coats of sealer to CMU wall surfaces. Prepare all surfaces as recommended by the manufacturer. Materials shall be installed per all manufacturer recommendations and requirements.

2.09 SOURCE QUALITY CONTROL

A. Concrete Masonry Unit Tests: For each type, class, and grade of concrete masonry unit indicated, units will be tested by qualified independent testing laboratory for strength, absorption, and moisture content per ASTM C 140, and linear drying shrinkage per ASTM C146.

B. Grout Unit Tests: Grout shall be tested for compressive strength per ASTM C1019.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of unit masonry.

B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation and verify compliance with number and locations of conduits within unit cells.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in Project.

B. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.

C. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.

D. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.

E. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting where possible.

F. CONDUITS AND PIPES IN MASONRY WALLS:

1. Conduits, up to ¾" diameter, shall be allowed in cells for vertical runs only, in accordance with the following parameters. No horizontal runs are allowed except that vertical offsets up to 24" in length will be allowed to avoid interference and congestion with reinforcing steel and other embedded items.

   Water, gas and other pipes may penetrate through a wall in a sleeve, but shall not be embedded in walls.

2. Reinforced cells: Limit conduit to 1 – 3/4" dia. conduit per cell, provided the following conditions are maintained:

   a) Reinf. Steel shall be properly placed and shall not be relocated to accommodate conduits.

b) Grout cover between conduit and reinf. steel shall be 2.5 x bar dia., 1/2" min. (1 1/2" @ #5, 1 7/8" @#6).

b) Maintain a minimum clear area within the cell of 3"x3" for consolidation by vibration.

3. Unreinforced cells: Limit conduit to 2 – ¾" dia. or 1-1" dia. conduit per cell, provided the following conditions are maintained:

a) Conduit shall not be placed closer than 3 dia., center to center, to adjacent conduit.

b) Maintain a minimum clear area within the cell of 3"x3" for consolidation by vibration.

4. No conduits are allowed in walls less than 8" nominal thickness.

G. Retaining walls:

1. Masonry retaining walls designed to be tied to floor or roof at top of wall shall be braced prior to the placement of backfill.
2. Cantilever retaining walls shall not be braced.
3. Backfill placement shall be performed in proper lifts under soil engineer supervision to avoid developing significant lateral earth pressures.

3.03 CONSTRUCTION TOLERANCES

A. Comply with construction tolerances of referenced unit masonry standard ACI 530.1-05, Part 3, 3.3G.

3.04 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.

B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.

C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less that nominal 4-inch horizontal face dimensions at corners or jambs.

1. Stack Bond, unless otherwise indicated in drawings.
2. Maximum spacing of reinforcing steel is 16".

D. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry. If work is stopped for one hour or more, stop grout at ½" min. and 2" max. below top of units.

E. Built-In Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

a. At exterior frames insert extruded polystyrene board insulation around perimeter of frame in thickness indicated but not less than 3/4 inch to act as a thermal break between frame and masonry.

3.05 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units as follows:

1. Typical Wall Units – All head and bed joints shall be with full mortar coverage on horizontal and vertical face shells for a distance in from the face of the unit not less than the thickness of the shell.

2. Columns, Pilasters and Wall Piers not exceeding 32" in length – All head and bed joints shall be with full mortar coverage. Face-to-face units shall have full mortar coverage over the contact surfaces. Bed webs in mortar in starting course on footings and in all courses of columns, pilasters and piers, and where adjacent to cells or cavities to be filled with grout.

3. Starting Course – At starting course on footings and slabs, spread out full mortar bed including areas under cells. Initial joint shall not be less than ¼" nor more than 1 inch in thickness. Comply with 2104A.1.2.1.

4. For stack bond coursing, provide wire ladder reinforcement in horizontal beds to keep wall aligned.

B. Set stone units in full bed of mortar with all vertical joints slushed full. Fill dowel, anchor, and similar holes solid. Wet stone joint surface thoroughly before setting; for stone surfaces that are soiled, clean bedding and exposed surfaces with fiber brush and soap powder and rinse thoroughly with clear water.

C. Cut joints flush for masonry walls to be concealed or to be covered by other materials, unless otherwise indicated.

3.06 MOVEMENT (CONTROL AND EXPANSION) JOINTS

A. General: Install control and expansion joints in unit masonry where indicated or based on industry standards. Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Install preformed control joint gaskets designed to fit standard sash block.

3.07 INSTALLATION OF REINFORCED UNIT MASONRY

A. General: Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.

B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

1. Grout lifts shall not exceed 5'-4". Comply with TMS 602, 3.5D.1.c.
2. Where grout pours exceed 5'-4" cleanouts are required.

D. Cleanouts: Clean-out openings shall be provided for 'High-Lift grouting' by one of the following methods.

1. Provide cleanouts in each cell at the bottom of each pour by removing the face shell.
2. Construct the course at the bottom of the pour with inverted, open-end bond-beam units and provide cleanouts in each reinforced cell by removing the face shell.
3. Where Cleanouts are located below concrete slabs or in locations where the wall surface is not visible, Cleanout openings may be tightly form plugged. Where Cleanouts are located in areas where the wall surface is visible, cleanouts shall be plugged with face shells to match the units.
4. Cleanouts shall be scaled before grouting, after inspection.

C. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.08 FIELD QUALITY CONTROL

A. Testing Frequency: Tests and evaluations listed in this article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.

2. Mortar composition and properties will be evaluated per ASTM C 780.
3. Grout compressive strength will be sampled and tested per ASTM C 1019.

B. Verification of Masonry Strength: Verify masonry strength, f'm, by one of the following methods as outlined in CBC, Section 2105A.2.2:

1. Prism Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM C 1314.
2. Masonry Prism Test Record: In absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated.

3. Unit Strength Method: Verify in accordance with procedure in CBC Section 2105A.2.2.1.

D. All structural masonry work shall be continuously inspected during laying, reinforcing placement and grouting by an inspector specially approved for that purpose by the architect and Owner.

3.09 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean brick by means of bucket and brush hand-cleaning method described in BIA "Technical Note No. 20 Revised" using the following masonry cleaner:

    a. Proprietary acidic cleaner; apply in compliance with directions of acidic cleaner manufacturer.

6. Clean concrete masonry by means of cleaning method indicated in NCMA TEK 45 applicable to type of stain present on exposed surfaces.

D. Finish Application: When concrete masonry is clean and dry, apply 2 coats of clear sealer in accordance with manufacturer's instruction and recommendations. Other finishes where indicated shall be applied in accordance with and by the applicable specification and trade.

E. Protection: Provide final protection and maintain conditions in a manner acceptable to Installer that ensures unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

2. Division 5 Section "Metal Fabrications" for steel references, loose steel bearing plates and miscellaneous steel framing.

1.02 REFERENCES

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."

a. In conformance with paragraph 3.2, the structural drawings identify the steel required for support of architectural, mechanical and electrical equipment. Contractor shall refer to the architectural, mechanical and electrical drawings for locations, detail configurations and other construction information.

b. Paragraph 4.3 (a) of the above code is hereby modified per Section 1.04 A.2.

2. AISC "Specifications for Structural Steel Buildings," including "Commentary."

3. "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections.

4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."

5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

6. California Building Code (CBC), 2013 edition, Chapter 22.

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.

2. Structural steel primer paint.

3. Shrinkage-resistant grout.

C. Shop Drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.

1. Fabricator and detailer shall be responsible for coordination of all contract documents for required steel work. Comply with AISC – Code of Standard Practice for Steel buildings and Bridges, Section 4.

2. Indicate welds by standard AWS symbols, Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories distinguishing between shop and field welds, and show size, length, and type of each weld. Include erection drawings, elevations and details where applicable. Indicate welded connections using standard AWS A2.4 Welding Symbols. Indicate net weld lengths.

3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

4. Where drawings are in conflict, detailing shall not be completed for affected items until the detailer has requested clarification/revision from the Architect and has received written directive for such change as may be required. Request for clarification/revision shall be by RFI or by clouded comment on the initial shop drawing submittal. Fabricator shall be responsible for changes to the shop drawings required where shop drawings have progressed prior to resolution of discrepancies.

5. Detailing shall allow for minor coordination changes and revisions as a part of the contract services.

D. Welder Certifications (in accordance with AWS qualification requirements):

E. Manufacturer's Certificates certifying welders employed on the work have been AWS qualified within the previous 12 months, in accordance with AWS-WHB-1.

F. Written Welding Procedure Specification (WPS)

G. Inspection reports conducted on shop and field High-Strength 'Slip Critical' bolted and welded connections: Include data on type(s) of tests conducted and test results.

1.04 SHOP DRAWINGS

A. Fabricator shop drawings shall be submitted in compliance with Division 01, Section 01 33 00. See Section 1.03.C. for submittal information required.

1. Comply with AISC Code of Standard Practice for Steel Buildings and Bridges, Section 4.

2. Use of CAD files and/or copies of design drawings: Comply with AISC Code of Standard Practice, Section 4.3 with the following exception:

a. Replace section 4.3 (d) with the following: "The Contractor shall compensate the Engineer, not to exceed $150.00 per drawing, for preparation of CAD files including the removal of information that is not required for the fabrication or erection of the structural steel from the CAD files for the preparation of CAD files to be used as part of the shop or erection drawings.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Steel work installers shall meet one or more of the following:

1. A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector with more than 5 years experience with similar work.

2. A steel work installer with a minimum of 5 years experience who has successfully completed three (3) projects of similar scope and size to that specified for this project.

B. Fabricator Qualifications: Steel fabricator shall meet one or more of the following:

1. A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant.

2. A fabricator who has a minimum of 10 years experience who has successfully completed at least three (3) projects of similar scope and size to that specified for this project in the past 5 years.

C. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within previous 12 months for the types of welding to be performed.

2. If recertification of welders is required, retesting will be the Contractor's responsibility.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in such quantities and at such times to ensure uninterrupted progress of Work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay Work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1. Clean and relubricate bolts and nuts that become dry or rusty before use.

2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including the following:

1. Pitting.

2. Rust and scale.

3. Seam marks.

4. Roller marks.

5. Rolled trade names.

6. Roughness.

B. Remove blemishes by grinding or by welding and grinding prior to cleaning, treating, and applying surface finishes.

C. Structural Steel W, S and M shapes: ASTM A992.

D. Structural Steel C and MC shapes, Angles, Plates and Bars: ASTM A36.

E. Braced-Frame and Moment-Frame Gusset Plates, Base Plates and Cap Plates: ASTM A992.

F. Square Cold-Formed Structural Steel Tubing (HSS): ASTM A500, Grade B.

G. Round Structural Steel Tubing: ASTM A53, Grade B.

H. Shear Connectors: ASTM A 108, Grade 1015 or 1020, headed-stud type, cold-finished carbon steel with dimensions complying with AISC Specifications.

I. Unheaded Anchor Bolts and Nuts: ASTM A 307, Grade C or ASTM F 1554, Grade 36; unheaded, unless otherwise indicated. Use headed bolts where embedded in the sides of masonry units.

J. Headed Anchor Bolts and Nuts: ASTM A 307, Grade A or ASTM F 1554, Grade 36 headed, unless otherwise indicated.

K. Unfinished Threaded Fasteners and Nuts: ASTM A307 or ASTM A; regular low carbon-steel bolts; and carbon-steel nuts.

1. Provide either hex or square heads and nuts.

2. Use only hex units for exposed connections.

L. High-Strength Threaded Fasteners: Heavy hex structural bolts, heavy hex nuts, and hardened washers, as follows:

1. Quenched and tempered medium carbon-steel bolts, nuts and washers, complying with ASTM A325.

a. Where indicated as "SC" type connections – Provide "Slip-Critical" connections with faying surfaces per AISC.
b. Where indicated as galvanized, provide units that are mechanically deposited zinc-coating, ASTM B 695, Class 50 or Hot-dip zinc-coating, ASTM A153.

L. Welding Electrodes: Comply with AWS Code; ASTM 233, E-70 Series.

M. Structural Steel Primer Paint: SSPC - Paint 2; red lead-iron oxide, oil alkyd. Does not count as paint finish primer for exposed steel.

N. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.

O. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:

a. Sonogrout; Sonneborn/Contect.
b. Euco N.S.; Euclid Chemical Co.
c. Sealtight 588 Grout; W. R. Meadows.

P. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content is not less than the following:

1. Basic Oxygen Furnace (BOF) produced steel: 16% minimum.

2. Electric Arc Furnace (EAF) produced steel: 67% minimum.

2.02 FABRICATION

A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications on final Shop Drawings.

1. Properly mark and match-mark materials for field assembly.

2. Fabricate for delivery a sequence that will expedite erection and minimize field handling for materials.

3. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

C. Bolt field connections, except where welded connections or other connections are indicated.

1. Provide high-strength 'Slip Critical' threaded fasteners where indicated as "SC" type.

2. Provide unfinished threaded fasteners for other connections primary and of secondary framing members to primary members (including girders, beams, purlins, girts, bracings and other framing members used) and for temporary bracing to facilitate erection.

D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A325 or A 490 Bolts" for "slip-critical" type connections (SC). High strength bolts specified as A325 "bearing" type do not require faying surface preparation and shall be "torque indicator" type bolts.

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.

G. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final Shop Drawings.

1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2. Weld threaded nuts to framing and other specialty items as indicated to receive other work.

3. Provide unfinished threaded fasteners for other primary connections and for secondary framing members to primary members and for temporary bracings to facilitate erection.

H. Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical expansion joints as indicated on drawings.

I. Camber: Where cambers in steel members are indicated, cambering shall be in accordance with Section 6 of the AISC Code of Standard Practice for Buildings and Bridges. Cambers shall be by "cold cambering" unless fabricator's shop facilities can produce specified results by "heat cambering" without detrimental effects on the steel materials. Fabricator shall have successful experience history of "heat cambering" and shall obtain architect's approval before proceeding. Where aesthetic cambering in steel is required as indicated on the drawings cambering shall be by roller bending or other approved means so as to produce a smooth radius curve the full length of the member or between any two points indicated. Where camber is specified for cantilever beams the back-span camber shall be a radius curve between the two supports and the cantilever camber shall be a radius curve from the cantilever support to the end of the cantilever, unless otherwise specified. Indicate cambering on the shop drawings.

2.03 SHOP PRIMING & PAINTING

A. General: Shop-prime all structural steel that is exposed or concealed, except those members or portions of members to be embedded in concrete or mortar. Prime embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only. Verify compatability of primer with paint manufacturer of subsequent paint coatings for all steel that is exposed and indicated to be painted prior to acquiring or applying primer.

1. Do not prime surfaces to be welded or high-strength bolted with friction-type "SC" connections.

2. Apply 2 coats of primer paint per requirements of Section 09 91 00 to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steelwork to be primed. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-1 "Solvent Cleaning."

2. SP-2 "Hand-Tool Cleaning."

3. SP-3 "Power-Tool Cleaning."

C. Painting: Immediately after surface preparation, apply structural steel primer paint that is compatible with subsequent paint coatings in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

D. Wrap and protect from damage all steel that will be exposed to view and is either shop painted (in addition to priming) or is to be field painted.

2.04 SOURCE QUALITY CONTROL

A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency.

1. Inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

2. Promptly remove and replace materials or fabricated components that do not comply.

B. Design of Members and Connections: Steel supplier, fabricator or erector shall not design any portion of the steel structural components used. Details shown on the drawings are typical; similar details apply to similar conditions, unless otherwise indicated. Where information is not provided to complete the construction, contractor shall inform architect. Work shall not continue on affected components until written directive has been submitted.

1. Verify dimensions at site whenever possible without causing delay in the work.

2. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.01 ERECTION

A. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.

1. Remove temporary members and connections when permanent members are in place and final connections are made.

2. Provide temporary guide lines to achieve proper alignment of structures as erection proceeds.

B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

C. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

4. For proprietary grout materials, comply with manufacturer's instructions.

D. Field Assembly:

1. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening.

2. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.

3. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

E. Level and plumb individual members of structure within specified AISC tolerances.

F. Members and framing supported by cambered members shall be set with the camber to allow for expected deflections due to the weight of materials to be supported, unless specifically noted.

G. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

H. Splice members only where indicated and accepted on Shop Drawings.

I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.

1. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable by Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

K. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting or painted under section 09 91 00.

1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.02 QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to inspect high-strength bolted connections and welded connections and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

C. Testing agency may inspect structural steel at plant before shipment.

D. Correct deficiencies in or remove and replace structural steel that does not comply with specified requirements.

E. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

END OF SECTION

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SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated miscellaneous ferrous metal items, galvanized and prime painted, not included in Section 05 12 00, Structural Steel. Items include, but are not limited to, brackets, lintels, ladders, architectural features and similar items as indicated.

B. Stainless steel metal items such as fascias, shade louvers, countertops and railings, not included in Section 05 12 00, Structural Steel.

C. Related Sections:
1. Section 05 12 00, Structural Steel Framing

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME)
1. ASME B18 Fasteners

B. American Society for Testing and Materials (ASTM)
1. ASTM A36/A36M Carbon Structural Steel
2. ASTM A48/A48M Gray Iron Castings
3. ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless
4. ASTM A123 Zinc (Hot-Dip Galvanized) on Coatings on Iron and Steel Products
5. ASTM A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
6. ASTM A276 Stainless Steel Bars and Shapes
7. ASTM A283/A 283M Low and Intermediate Tensile Strength Carbon Steel Plates
8. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
9. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes
10. ASTM A513 - Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
11. ASTM A563 - Carbon and Alloy Steel Nuts
12. ASTM A653/A 653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
13. ASTM A666 Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar (non magnetic).
14. ASTM D520 - Standard Specification for Zinc Dust Pigment.

15. ASTM A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
16. ASTM C1107 - Packaged Dry Hydraulic – Cement Grout (Non-Shrink)
17. ASTM F594 Stainless Steel Nuts
18. ASTM F1554 - Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

C. American Welding Society (AWS)
1. AWS A2.4 - Standard Symbols for Welding, Brazing and Non Destructive Examination
2. AWS A5.1 - Carbon Steel Covered Arc-Welding Electrodes

D. California Code of Regulations (CCR)
1. Title 8, Chapter 3.2
2. Title 8, Division 1, Subchapter 7, Group 1, Article 4, Section 3277, Fixed Ladders
3. Cal/OSHA, Subchapter 4 Construction Safety Orders
4. Title 24, Part 2, 2010 California Building Code (CBC), Chapter 22A.
5. Title 12, California Fire Code Chapter 26 Welding and Other Hot Work.

E. Steel Structures Painting Council (SSPC)
1. SSPC SP-2 - Steel Preparation

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
2. Structural steel primer paint.
3. Shrinkage-resistant grout.

C. Shop Drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
1. Fabricator and detailer shall be responsible for coordination of all contract documents for required steel work. Comply with AISC – Code of Standard Practice for Steel buildings and Bridges, Section 4.
2. Indicate welds by standard AWS symbols, Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories distinguishing between shop and field welds, and show size, length, and type of each weld. Include erection drawings, elevations and details where applicable. Indicate welded connections using standard AWS A2.4 Welding Symbols. Indicate net weld lengths.
3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

4. Where drawings are in conflict, detailing shall not be completed for affected items until the detailer has requested clarification/revision from the Architect and has received written directive for such change as may be required. Request for clarification/revision shall be by RFI or by clouded comment on the initial shop drawing submittal. Fabricator shall be responsible for changes to the shop drawings required where shop drawings have progressed prior to resolution of discrepancies.

5. Detailing shall allow for minor coordination changes and revisions as a part of the contract services.

D. Welder Certifications (in accordance with AWS qualification requirements):

E. Manufacturer's Certificates certifying welders employed on the work have been AWS qualified within the previous 12 months, in accordance with AWS-WHB-1.

F. Written Welding Procedure Specification (WPS)

G. Inspection reports conducted on shop and field High-Strength 'Slip Critical' bolted and welded connections: Include data on type(s) of tests conducted and test results.

1.04 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following
1. AWS D1.1, Structural Welding Code--Steel.
2. AWS D1.3, Structural Welding Code--Sheet Steel.
3. AWS Certified welders.
4. AWS D1.6, Structural Welding Code--Stainless Steel.

B. Coating applicator - Galvanized Metal Fabrications: Company specializing in hot-dip galvanizing after fabrication and following the procedures in the *Quality Assurance Manual* of the American Galvanizers Association.

1.05 FIELD MEASUREMENTS

A. Verify field measurements prior to submittal of shop drawings and fabrication.

PART 2 - PRODUCTS

2.01 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in completed

Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.02 FERROUS METALS

A. Steel Sections: ASTM A992 for W-Shape sections and ASTM A36 for all other members.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Bending or cold-formed steel ASTM A283, Grade C.

D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars ASTM A240, Type 304, Type 304L, Commercial Grade No. 4 finish, 16 gauge minimum, unless otherwise indicated. Stretcher-leveled standard of flatness for countertops.

E. Stainless-Steel Bars and Shapes ASTM A276, Type 304L.

F. Steel Round Structural Tubing ASTM A500, Grade B.

G. Pipe ASTM A53, Grade B, Type E or S, Schedule 40, galvanized where indicated.

H. Cast Iron ASTM A48/A48M, Class 30, unless another class is indicated or required by structural loads.

I. Square and rectangular steel tubing structural, carbon steel conforming to ASTM A500.

J. Mechanical Tubing: ASTM A 513 hot- or cold-rolled carbon steel for non-structural tubing, electric welded tubing.

2.03 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563 and ANSI B18.2.1; and, where indicated, flat washers and ASTM A325 as indicated on drawings.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, nuts and, where indicated, flat washers; ASTM F593/(ASTM F738M) for bolts and ASTM F594/F836M) for nuts, Alloy Group (A1) (A4).

1. Stainless Steel Fastenings and Fittings at Food Preparation areas
    a. Bolts and screws with countersunk flat heads at interior and exterior visible or accessible surfaces.
    b. Use concealed fastenings where possible.

D. Anchor Bolts ASTM F1554, Grade 36.

E. Machine Screws ASME B18.6.3.

F. Lag Bolts ASME B18.2.1.

G. Wood Screws Flat head, carbon steel, ASME B18.6.1.

H. Plain Washers Round, carbon steel, ASME B18.22.1.

I. Lock Washers Helical, spring type, carbon steel, ASME B18.21.1.

J. Threaded rods, steel yokes and plates – ASTM A36.

K. Self-drilling, self-tapping screws, ASTM C954, galvanized, minimum #10 unless noted otherwise on drawings. By Buildex/Tomarco or equal.

L. Anchorage Devices, Drilled Expansion Anchors Minimum 5/8-inch diameter with 3 inch embedment unless noted otherwise on drawings. Allowable shear and tension values as permitted in ICC-ES, ESR-1917 Hilti Kwik Bolt TZ Concrete Anchor or Hilti Kwik Bolt 3, ESR-1385 for masonry anchors, by Hilti Inc., Tulsa, OK.

2.04 MISCELLANEOUS MATERIALS

A. Shop Primer Fabricator's rust inhibitive primer suitable for finish scheduled in Section 09 91 00.

B. Galvanizing Repair Compound for metal to be painted: ASTM D520 Type III, "ultra pure" high purity grade. Touch-Up products for Galvanized Surfaces Ready mixed Zinc rich galvanizing compound, 95% zinc.
   1. Finish: ZRC Products Company, Marshfield, MA or equal. Primer for repaired galvanized to receive a painting finish.

C. Zinc-Based Solders/Alloys for exposed galvanized finish: Solder Zinc Alloy for Repair ASTM A780 Annex A1; Welco Gal-Viz self-fluxing solder alloy, Galvalloy, Galvabar or equal, ASTM A780, paragraph A1. Repair Using Zinc-Based Alloys.

D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
   1. Welding Materials: AWS A5.1, E70XX for Grade 40, E90XX for Grade 60, type and procedures required by electrode manufacturer for materials being welded.

E. Grout ASTM C1107, Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 8,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

2.05 FABRICATION

A. Fit and shop assemble in largest practical sections for delivery to site.

B. Ease exposed edges to small uniform radius.

C. Fabricate items with joints tightly fitted and secured.

D. Welded Joints. Seal joined members by continuous welds. Dress welded joints, leaving no burrs, or sharp or abrasive corners, edges or surfaces.
   1. Where exposed to view in finished, interior and exterior habitable spaces, dress welds in accordance with NOMMA Guidelines for Finish 1.
   2. Where exposed to view in utility type spaces and roof tops, dress welds in accordance with NOMMA Guidelines for Finish 2.
   3. Where concealed, dress welds in accordance with NOMMA Guidelines for Finish 3.

E. Exposed Mechanically Fastened Joints. Make exposed, mechanically fastened joints hairline-tight, flush, butt joints. Secure with flush-mount, countersunk, screws or bolts; unobtrusively located; consistent with design of component, except where specifically indicated otherwise.

F. Provide components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as related metal fabrication, unless expressly indicated otherwise.

G. Stainless Steel Countertops
   1. Fabricate from 0.060-inch, minimum, Type 304 stainless steel sheet
   2. Exposed surfaces and edges shall have No. 4 (satin) finish.
   3. To the extent practicable, fabricate tops in a single piece for each run of casework. Do not locate needed joints within 30-inches of a sink.
      a. Factory joints: electrically welded, ground smooth and finished to match exposed top surface.
      b. Field joints: not permitted within openings and serving areas.
      c. Fabricate field joints to be mechanically cinched with continuous splines and draw bolts resulting in flat level surfaces and a hairline-tight seam, supported the full length of joint.
   4. Fabricate tops to be installed without field cutting or drilling. Take measurements at the Site and coordinate fabrication with related casework.
   5. Back and end splashes shall be 4-inches high, unless expressly indicated otherwise, and shall meet horizontal surface of top with integral, coved joint. Form tops and backsplashes from single sheet of metal.
   6. Reinforce tops with continuous stainless steel channels welded to the underside along length to prevent twisting, oil canning, or buckling of surface. Reinforce tops at the perimeter of sinks.

2.06 FINISHES

A. Steel and Iron
   1. Clean surfaces of rust, scale, grease and foreign matter prior to finishing. Prepare in accordance with SSPC SP-2. Dress all welds.
   2. Galvanize steel items indicated to zinc coating thickness in accordance with ASTM A123, minimum Coating Grade 80 (1.9 oz/sq. ft.). Surfaces shall be free of icicles, spangles and puddling. Provide venting holes at all enclosed sections, "V" notch, and drilled holes are acceptable. Locate to prevent rainwater from entering enclosed sections at exterior galvanized items. For sheet steel items, galvanize per ASTM A653 G60 Coating Designation.
   3. Galvanized items to be painted: Do not use quenching solutions or treatments immediately after galvanizing. Refer to individual sections for galvanized items to be painted and to Section 09 91 00.
   4. Do not prime surfaces in direct contact with concrete or where field welding is required.
   5. For painted surfaces, prime items with two coats in accordance with requirements of primer specified herein and as required to prevent steel items exposed to elements from rusting prior to application of finishes.

B. Stainless Steel Finishes
   1. Remove tool and die marks and stretch lines or blend into finish.
   2. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of individual pieces, except adjacent lapped or abutted pieces that form a larger panel shall have the grain running in the same direction as directed by Architect.
   3. Bright, Directional Satin Finish No. 4.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.
   1. Weld joints using shielded metallic electric arc (SMAW) method. Use coated welded rods, not fluxed, or type recommended by manufacturer for use with parent metal. Use only certified welders for structural construction.
   2. Grinding: Grind welds on surfaces subject to traffic or contact to smooth flush joints (prio0r to galvanizing or priming).
   3. Peening: Remove flux and weld spatter as necessary to eliminate unsightly conditions and grind off sharp projections.
   4. Permanently Concealed Welds: No treatment required other than preparation for painting or galvanizing.

D. Perform field welding in accordance with AWS standards and procedures for metal alloy welded.

E. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions and surfaces not shop primed or that are damaged during erection, except surfaces to be in contact with concrete.

G. Repair of Galvanized Surfaces to be Painted: Ready mixed, zinc-rich galvanizing compound, ASTM D520, ASTM A780 - A2. Repair Using Paints Containing Zinc Dust, minimum thickness 5 mils.

H. Repair of Galvanized Surfaces to be Exposed: ASTM A782 Annex A1, apply Gal-Viz while metal is still hot. Tin surface with Gal-Viz with wire brush. Do not direct flame on alloy. Minimum thickness, 5 mils.

3.04 ERECTION TOLERANCE

A. Maximum Variation From Plumb: 3/16 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 3/16 inch, non-cumulative.

3.05 FINISHES

A. Paint with Gloss Polyurethane High Performance Coatings in Special Coatings per Section 09 91 00 Painting.

3.06 SCHEDULE

A. Schedule is a list of principal items only. Refer to Drawing details and other specification sections for items not specifically scheduled including various miscellaneous steel angles pipes, threaded rods, tubes and similar shapers used for brackets, clips and supports for various items located throughout.

B. Fasteners: Provide sufficient fasteners and connectors of approved types, whether indicated or not for solid secure attachment and installed in straight lines of uniform pattern. Match finish of steel unless otherwise indicated.

C. Interior Vertical Access Ladder: as detailed in drawings for field painting.

D. Steel Backing Plates 1/4 inch thick x widths and lengths required to support wall bumper, plumbing fixture hanger, equipment and as detailed. Cope wood studs and screw plates flush to surface with No. 14 x 2 ½" wood screws at top and bottom of each stud (16" o.c. max.).

E. Railing and Handrails as detailed:
   1. Galvanized Finish steel pipe and brackets at exterior stairs, ramps and landings where indicated in drawings.
   2. Steel pipe guardrails primed for field painting at interior stairs, ramps and landings where indicated in drawings.

F. Stainless Steel fabrications: 16 gauge Countertops from formed sheet metal and 16 gauge stainless steel wall armor and corner guards. Profiles, shapes, and sizes as indicated in drawings.

G. Steel brackets and supports for counter tops as detailed.

H. Steel framing and support for plumbing, mechanical and/or electrical equipment.

END OF SECTION

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SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Rough carpentry, including structural wood framing materials and procedure.

B. Related Sections:
1. Division 06 Section, "Miscellaneous Carpentry" for additional miscellaneous framing work.
2. Division 06 Section "Interior Architectural Woodwork" for related blocking, backing.

1.02 REFERENCES

A. Chapters 7 and 23, 2013 CBC.

B. National Design Specification for Wood (AWC NDS), 2012 Edition.

C. Special Design Provisions for Wind and Seismic (AWC SDPWS), 2008 Edition.

D. DOC PS 1-07 - Department of Commerce Product Standard, U. S. Product Standard for Construction and Industrial Plywood.

E. DOC PS 20-05 - Department of Commerce Product Standard, American Softwood Lumber Standards.

F. DOC PS 2-04 - Department of Commerce Product Standard, U. S. Product Standard for Construction, Performance Standard for Wood-Based Structural-Use Panels.

G. ANSI A135.4-1995 - Basic Hardboard.

H. WWPA - Western Lumber Grading Rules 88, Latest Edition, by Western Wood Products Association.

I. APA - American Plywood Association Design/Construction Guide (Engineered Wood Association).

J. AQMD - Local Air Quality Management District Regulations.

K. AWPA U1 - Use Category System: User Specification for Treated Wood.

L. WCLIB - West Coast Lumber Inspection Bureau Standard Grading Rules No. 17.

M. Title 8 - California Code of Regulations, Construction Safety Orders.

N. ICC –ES – International Code Council Evaluation Service, Inc. Legacy Reports.

O. RIS – Redwood Inspection Service, Standard Specifications for Grades of California Redwood Lumber, 1997.

P. FSC – Forest Stewardship Council Principles and Criteria.

1.03 SUBMITTALS

A. Product data and current ICC-ES Reports for framing anchors. (Do not submit framing anchor product catalog except for manufacturer substitution.)

1.04 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp on all products required.

B. Grade Stamp: Association under whose rules it was graded, or official grade mark of other recognized grading agencies using grading rules, equivalent to WWPA or WCLIB.

C. Association performing grading and grade marking of lumber shall be approved by Division of the State Architect (DSA).

D. Nailing guns and nail operators shall be approved in accordance with Title 8 Construction Safety Orders.

E. All Plywood shall be free of urea-formaldehyde binders and adhesives.

1.05 DELIVERY, STORAGE AND HANDLING

A. Do not deliver rough carpentry items until site conditions are adequate to receive the Work. Protect items from weather while in transit.

B. Store lumber and plywood at the site under cover or otherwise protected against exposure to weather, raise above ground and out of contact with damp or wet surfaces. Stack lumber and plywood and provide for air circulation within and around stacks and under temporary covers. For pressure treated lumber and plywood, provide spacers between courses to permit air circulation.

C. Certified wood shall be kept separate from non-certified wood. Auditing process as mandated by certifiers shall be complied with.

1.06 PROJECT CONDITIONS

A. Cooperate with other trades in coordinating their Work with the Work of this Section. Provide wood grounds, blocking and nailer where indicated or as required for Work of other trades.

PART 2 - PRODUCTS

2.01 ROUGH CARPENTRY MATERIALS

A. Lumber: Graded in accordance with WWPA or WCLIB; maximum moisture content of 19 percent at time of installation. Provide Douglas Fir Larch for structural and framing lumber, surfaced four sides to standards of the grading association unless otherwise indicated on Drawings, use the following grades
   1. Joists, rafters, beams, lintels, horizontal framing, posts, studs and vertical framing: No. 1 unless otherwise indicated or noted on drawings.
   2. Non-bearing studs and plates, non-structural furring, concealed blocking, stripping and miscellaneous nailers and backing: No. 2 unless noted otherwise in the structural drawings.
   3. Structural Drawings take precedence for lumber grades.
   4. All lumber in contact with concrete and within 8'' of soil exposure shall be pressure treated.

B. Shop Fabricated Structural Wood:
   1. LVL: Where indicated, use Microllam material per ICC ESR-1387 – Fb = 2600 psi, Fv = 285 psi, E = $1.9x10^6$, or approved equal. (Approved substitutes shall have ICC approval.)
   2. PSL: Where indicated, use Parallam material per ICC ESR-1387 – Fb = 2700 psi, Fv = 260 psi, E = $1.9x10^6$, or approved equal. (Approved substitutes shall have ICC approval.)
   3. LSL: Where indicated, use Timberstrand material per ICC ESR-1387 – Fb = 2600 psi, Fv = 400 psi, E = $1.7x10^6$, or approved equal. (Approved substitutes shall have ICC approval.)
   4. Rim Board: (Non-structural use for rims with full length bearing only) Where indicated, use Timberstrand LSL Rim Board, TJ-Strand Rim Board, e-Rim Board or iLevel Rim Board material per ICC ESR-1387 –, E = $1.3x10^6$ psi minimum, or approved equal. (Approved substitutes shall have ICC approval.)

C. Exterior Trellis Exposed Wood Construction: Dimension Lumber and Timber per DOC PS 20. Species: Douglas-fir larch or other species indicated. Grade; Select Structural, WCLIC. Provide material hand-selected for uniformity of appearance and free from characteristics, on exposed surfaces and edges that would impair finish appearance, including decay, honeycomb, knot-holes, shakes, splits, torn grain, and wane.

1. Provide timber framing complying with requirements, according to grading rules of grading agency indicated.
2. For exposed lumber and timber to receive a stained or natural finish omit grade stamp and provide Certificates of Grade compliance issued by grading agency.

D. Plywood: Section 2303.1.4 CBC, Douglas Fir 1 Group Species, PS 1, APA, CDX or Structural I Rated Sheathing as specified in Structural Drawings. Bond Classification: Exterior. Thickness as indicated, span rating sized for spacing.
1. For natural finished plywood: Panel Grade N veneer on face and B on back side.
2. For painted finish: APA Sanded Plywood Panels, A-C Group 1, Exterior, sanded face, touch sanded back side.
3. Thickness: Minimum 15/32 inch for walls and 19/32 inch for roof, or as indicated on Drawings.
4. Where indicated provide Fire-Retardant treated Plywood per paragraph J below.

E. Roof Plywood Decking: requiring FM 1-90 Wind and Fire Classification, minimum 5/8" (19/32 inch) thick. Section 2304.7.2 CBC, Douglas Fir 1 Group Species, PS 1, APA, CDX or Structural I Rated Sheathing as specified on Structural Drawings. Bond Classification: Exposure 1, B-C Veneer Grade, sanded 1 side. Thickness as indicated, span rating sized for spacing. Provide 3/4" Fire-retardant plywood for attaching roof shingles at non-combustible metal-framed buildings.

F. Texture Plywood: Not used for this project.

G. Oriented Strand Board (OSB): PS 2, APA PRP-108, 15/32 inch through 3/4 inch APA Rated Sheathing and Structural 1 Rated Sheathing, Exposure 1, meeting NES "Oriented Strand Board Roof and Wall Sheathing, Combination Subfloor/Underlayment OSB Lap and Panel Siding (NER-124)". OSB shall be considered an acceptable option to plywood and shall meet all rating criteria as specified on the drawings for plywood.

H. Preservative (Pressure) Treated Lumber: Section 2303.1.8 Conform to AWPA Manual of Recommended Practice, kiln dry after treatment. Use preservative complying with AWPA U1, latest edition. Products NOT containing arsenic or chromium. Conform to AQMD, Local Regulations.
1. Douglas Fir Larch, used as required by Section 2303A, CBC, shall conform to the following
   a. Lumber shall be WWPA or WCLIB grade stamped.
   b. Lumber shall be No. 1 grade or better unless indicated otherwise on Drawings.

I. Waterproof Membrane: ASTM D4601; Type II, asphalt saturated glass felt where other products are not indicated.

J. Fire-Retardant Treated Wood: Section 2303.2 CBC (only where indicated for fire resistive assemblies and non-combustible construction).
   1. Fire-Retardant Douglas Fir Lumber: Lumber shall be grade stamped by an approved agency at the factory, and shall bear identification indicating the fire performance rating thereof, Flame Spread Less than 25, ASTM E84. Lumber: AWPA C20.
   2. Fire-Retardant Treated Douglas Fir Plywood: AWPA Standard C-27, NFPA 703, ASTM D-5516, ASTM E-84, Section 2304A.5, CBC, PS 1-07, APA structural rated sheathing, Exposure 1, 5/8 thick. Plywood shall comply with the following Maximum Flame Spread Classifications in the following locations
   3. Horizontal Exitways: All Occupancy Groups: Class II, except Occupancy Group I: Class I.
   4. Rooms/Areas: All Occupancy Groups: Class III, except Occupancy Groups A and I: Class II.
   5. Other Locations: As indicated on drawings.

K. Plywood Backing Panels
   1. Telephone and Electrical Equipment, fixed equipment, cabinets, grab bars, door stops and plates: DOC PS 1, Exposure 1, APA A-C, sanded, Veneer Grade, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4 (23/32) inch nominal thickness. Installed "A" side out for paint finish.

L. Impact Resistance Plywood
   1. Manufactured by Olympic Panel Products; Product: Tempered Plyron or equal.
   2. Constructed of tempered hardboard laminated to Douglas Fir/Hemlock plywood.
   3. Thickness: 5/8 inch by 4 by 8 feet panels, or as indicated.
   4. Meets APA PS 1-07 requirements.

M. Nails, Brads, and Staples: ASTM F 1667.
   1. All nails shall be Common Wire Nails unless otherwise specified. Box, casing or other nails shall not be used unless specifically referenced.
   2. Nails, Spikes and Staples: Section 2304.9 CBC, Galvanized for exterior exposed applications, high humidity locations and installation into treated wood; plain finish for other interior and protected locations; size and type to suit application and as specified. Comply with Table 2304.9.1 unless detailed otherwise. Use common nails only.

N. Powder-Driven Fasteners: ICC ESR-2269.
   1. HILTI X-U drive pins of lengths indicated for application required. Designated lengths shall be verified with the supplier for proper application prior to installations.

O. Wood Screws: ASME B18.6.1.
   1. Connecting wood to wood: Wood screws shall be pre-drilled. The lead hole receiving the shank shall be no more than 7/8 of the shank diameter.

The lead hold receiving the threaded portion shall no more than 7/8 the diameter of the shank at the threaded portion. Wood screws shall not have upset threads. Decking screws are not allowed. Soap or other lubricant may be used on wood screws to facilitate insertion.

2. Connecting plywood to light gauge steel: Self-drilling, flat Phillips head, zinc-plated steel screws.
3. Connecting plywood to steel shapes: Thread cutting, flat Phillips head, zinc-plated steel screws with blunt points and tap-fluted pilots.

P. Lag Bolts: ASME B18.2.1. – A 307. See structural drawings for lead hole requirements.

Q. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and flat washers to all wood surfaces at heads and nuts.

R. Fasteners: Expansion type or powder actuated type for anchorage to solid masonry or concrete. Refer to Division 01, General Requirements for acceptable types and required testing. Where installation and torque verification of wedge-type anchors is inspected by the IOR, testing of anchors will not be required unless directed by the SEOR for structural tension applications.

S. Stock Framing Connectors: Section 2304.9 CBC types indicated on Drawings, galvanized, with nails fully driven in all holes in each face of connector. Conform to the following.

5. Manufacturers: Simpson Strong Tie Co., Inc., San Leandro, CA, United Steel Products, Montgomery, MN. or equal as approved in accordance with Division 01 Requirements for Substitutions.
6. ICC Listed.

T. Metal Framing Anchors:

1. General: provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
   a. Standard manufactured, stamped or formed steel, galvanized; types indicated for specific uses; complete with nails.

U. Nonshrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency for application and a 30 minute working time. Acceptable Manufacturers: Dayton Superior, Miamisburg, OH; Sonneborn, Shakopee, MN; Novex Systems International, Clifton NJ, or equal.

V. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

W. Adhesives: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.01 LAYOUT MARKINGS

A. Layout markings shall not be made with xylene-based inks, paint, or dyes, or with other solvent-based products that may bleed through finishes.

3.02 FRAMING, FURRING AND STRIPPING

A. Erect wood framing, furring, stripping and nailing members true to lines and levels. Do not deviate from true alignment more than 1/4 inch in 10 feet, non-cumulative.

B. Construct members of continuous pieces of longest possible lengths.

C. Construct and erect required headers and lintels.

D. Double wall framing members at openings over 100 square inches. Space short members above and below openings in same manner as for walls.

E. Provide double joist headers at joist ends and around openings at non-bearing walls unless otherwise indicated on Drawings. Bridge joists and rafters to conform to Section 2304 CBC and as noted on plans. For pre-manufactured joists, provide bridging in accordance with manufacturer's recommendations.

F. Construct walls with studs of size and spacing indicated, 16 inches on center unless otherwise indicated on drawings. Install single sill member at bottom and double plate at top. Stagger upper and lower members of double plate with joints not less that 4 feet o.c. or as indicated on Drawings. Where sill or any wood member contacts concrete or masonry within 8" of soil or exposed to weather, install preservative-treated lumber.

G. Provide one row of solid blocking not less than 2 inch nominal thickness and same width of stud at ceiling and floor lines and at spacing not to exceed 8 feet on center vertically. Fit snugly and attach with not less than two 10d nails.

H. Install 3 studs minimum at corners positioned to provide a minimum of 1/2" bearing surface at inside corners for interior and exterior finishes, unless solid corner posts are indicated.

I. Conform to structural drawing requirements for cutting, notching and boring of sills, plates, joists and beams for required penetrations.

J. Conform to Section 717, California Building Code for fire blocks and draft stops. Fire blocks and stops at 10-feet intervals and at ceiling level.

K. Fire-Retardant Wood: Ripping and milling are not permissible. Cross cutting to length, drilling holes, joining cuts and light sanding are permissible. It is not necessary to field treat cut ends to maintain flame spread rating. All cuts on plywood are considered end cuts and is permissible to be cut.

3.03 SUBFLOORING [NOT USED]

3.04 PLYWOOD SHEATHING

A. Thickness as indicated on the Drawings, minimum thickness 15/32 inch for walls, 19/32 inch for roofs.

B. Boundary Nailing: Not less than 3/8 inch from edge, spaced not more than 6 inches on center, unless noted otherwise on Drawings.

C. Blocking: Panel edges shall bear on framing members or solid blocking.

D. Minimum Size Vertical Panel: 16 inches wide.

E. Minimum Size Horizontal Panel: 24 inches wide.

F. Oriented Strand Board not permitted for shear panels unless indicated on structural drawings.

G. Where structural shear panels are indicated for a portion of a wall apply additional plywood sheathing over remainder of wall to provide flush face for finishes, or other approved material indicated.

H. All exterior surfaces of exterior walls to receive minimum 15/32" CDX plywood with 10d at 6" o.c. at edges and 12" o.c. at field locations. Refer to Structural Drawings for requirements at shear walls.

I. Nails for attachment of plywood or OSB wall sheathing to sill plates on concrete slabs and footings at or within 8" of exposed soil shall be hot-dipped zinc coating per ASTM A153.

J. Machine-Driven Nailing Approval Procedure:
   1. Should Contractor wish to use machine-driven nailing, he shall make specific written request, prior to beginning nailing work, for approval of exact fasteners, equipment, and methods proposed.
   2. Request will be reviewed by Architect/Engineer.
   3. Approval, if given, will be in writing, subject to satisfactory field performance.
      a. Use of machine nailing is subject to a satisfactory job-site demonstration for each Project and approval by Architect or Structural Engineer and DSA. The approval is subject to continued satisfactory performance. Machine nailing will not be approved in

5/16" plywood. If nail heads penetrate the outer ply more than would be normal for a hand hammer or if minimum allowable edge distances are not maintained, the performance will be deemed unsatisfactory.

3.05 FOUNDATION FRAMING, PLATES, SILLS AND SLEEPERS

A. Preservative treated wood required. Set wood sills on a bead of continuous butyl sealant on both sides of sill.

B. Use galvanized nails in treated wood and within 8" of exposed soil.

3.06 HORIZONTAL FRAMING

A. Bearing: 1-1/2 inch minimum on wood or metal, 3 inches on masonry unless otherwise detailed on drawings. Lay framing members with crown up. Members with knots at bottom not permitted.

B. Lateral Support: Use solid blocking, cross bridging or other approved means.

C. Do not run joists continuous beyond one span unless indicated otherwise on Drawings.

D. Openings: Frame openings in walls as specified on the structural drawings.

E. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.07 TRELLIS AND EXPOSED EXTERIOR WOOD INSTALLATION

A. Trellis, Post, Beams, Rafters and other members shall be level, plumb and true and shall rest on brackets or a bearing point free from racking.

3.08 INSTALLATION OF BACKBOARDS

A. Provide backing panels as indicated on Drawings to support telephone and electrical equipment, and blocking as indicated to support fixed equipment, cabinets, grab bars, door stops and plates. Fasten securely to framing. Ensure that backing panels are installed with good side out (whose face side is free of blemishes) side by side, no mix of sides permitted.

B. Install to extent indicated on the drawings or as required for electrical or communication system installation.

C. Install with sheet metal screws, No.10 minimum, at 12 inches on center minimum to metal studs or strapping and wood screws to wood studs or blocking. Drywall screws will not be permitted.

D. Prime paint exposed faces. Do not cover manufacturer's trade stamps indicating fire treatment.

E. Final finish per Section 09 91 00, Painting.

3.09 CLEAN –UP

A. Remove all debris from wood construction.

END OF SECTION

SECTION 06 18 00

GLUED-LAMINATED CONSTRUCTION

PART 1 – GENERAL

1.01 SUMMARY

A. Glued laminated (Glulam) timber is defined to include wood members fabricated from 2 inch nominal thickness lumber, glued face-to-face to a depth of four or more laminations.

1. Provide connectors, anchors, and accessories necessary to interconnect and secure Glulam members to building structure, and their installation.

B. The types of structural glued laminated units specified in this section include:

1. Straight beams, including girders and purlins, and cambered members.

C. Related Sections:

1. Division 05 Sections "Structural Steel" and "Metal Fabrications" for supporting steel members.
2. Division 06 Sections "Rough Carpentry" and "Miscellaneous Carpentry" for other related framing work.

1.02 REFERENCES

A. AITC 117 – 2010 Edition.

B. ANSI/AITC A190.1 Standard.

C. ASTMD 3737

D. ANSI/ASME B18.6.1

E. FSC – Forest Stewardship Council Principles and Criteria.

1.03 SUBMITTALS

A. Product data including specifications and installation instructions covering lumber, adhesives, fabrication process, preservative treatment, accessories and protection.

1. Submit certification signed by an officer of the fabricating firm indicating glued laminated timbers comply with requirements of ANSI/AITC A190.1.

B. Shop Drawings showing full dimensions of each member and layout of entire structural system. Indicate species and laminating combination, adhesive type, lamination laps, cambers and other variables in required work.

1.04 QUALITY ASSURANCE

A. Standards: Comply with ANSI/AITC A 190.1 "Structural Glued Laminated Timber".

B. Manufacturer Qualification: Provide factory-glued structural units, produced by an AITC-licensed firm, qualified to apply the AITC "Quality Inspected" mark.

C. Factory mark each piece of glued laminated structural units with AITC Quality Inspected mark.

1. Place AITC mark on timber surfaces, which will not be exposed, in completed work.

D. Installer: Firm which has demonstrated competence specializing in installation of glued laminated timber for at least 5 years.

E. Laminated units shall be free of urea-formaldehyde binders and adhesives.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Keep glued laminated structural units dry during delivery, storage, handling, and erection, by maintaining factory-applied protective covering in weather tight and light-proof condition, or by applying other weather tight protection. Maintain protective covering until building enclosure is completed to extent necessary for protection of interior Glulam work, and until final finishing of exterior work is ready to proceed. Do not store Glulam units in areas of either excessively high or excessively low relative humidity; comply with manufacturer's instructions.

B. Time delivery and installation of Glulams to avoid extended on-site storage, and to avoid delaying other trades whose work must follow erection of Glulams.

C. If laminated units are to be stored before erection, place individual units or bundle wrapped units on blocks well off ground with individual members separated for air circulation. Leave wrappings intact, but slit or puncture lower side to permit drainage of water, which may accumulate.

D. Certified wood shall be kept separate from non-certified wood. Auditing process as mandated by certifiers shall be complied with.

PART 2 - PRODUCTS

2.01 STRUCTURAL GLUED LAMINATED UNITS

A. Lumber: Comply with ANSI/AITC A190.1 and applicable lumber association standards cited therein for grades required to achieve Glulam requirements for

design values, appearance, fabrication limitations and species (if any). See drawings for sizes, lamination combinations, and stress values.

B. Lumber Species: Douglas Fir-Larch.

C. Adhesive: ANSI/AITC A190.1, "wet-use" type.

D. End Sealer: Manufacturer's standard transparent, colorless wood sealer, effective in retarding transmission of moisture at cross- grain cuts.

E. Penetrating Sealer: Manufacturer's standard translucent penetrating wood sealer, which will not interfere with application of wood stain and transparent finish, or paint finish, as indicated.

1. Refer to Division 9 sections for required field-applied finishes.

F. Connectors, Anchors, Accessories: Provide fabricated steel (ASTM A 36) shapes, plates and bars, welded into assemblies of types and sizes indicated. Provide steel bolts (ASTM A 307), lag bolts, nails, and other standard fasteners as required for installation.

1. Finish: Finish fabricated assemblies with rust-inhibitive primer, unless otherwise indicated.

2.02 FABRICATION

A. General: Comply with ANSI/AITC A190.1 and ASTM D 3737 in providing units indicated; where dimensions are not completely documented, provide manufacturer's standard sizes and shapes required to fulfill indicated performances.

1. Shop-fabricate for connections and connecting hardware to greatest extent feasible, including drilling of bolt holes.
2. All laminated units shall be marked to clearly identify the "TOP" of beam for proper installation.

B. Testing and Inspection: Comply with Inspection Manual AITC 200. Inspection certificates shall be submitted with all glued laminated units.

C. Appearance Grade: Provide Architectural Grade Resawn units, complying with AITC 110 where indicated on drawings to be exposed with stained finish.

D. Appearance Grade: Provide Industrial Grade units, complying with AITC 110, where indicated on drawings to be concealed or exposed with painted finish.

E. Camber: The required camber for fabrication of each member is shown on drawings, and may be either circular or parabolic, at manufacturer's option. Unless otherwise indicated, all single-span members shall be cambered to a +1600 ft. radius. Cantilever and multiple-span members shall not be cambered unless specifically indicated. Cambers shall be a smooth curve from support to

support or from support to end of cantilever. Where manufacturer's standard camber is other than 1600 ft. radius, beams shall be manufactured to provide the equivalent of a 1600 ft. camber.

F. End-Cut Sealing: Immediately after end-cutting each member to final length, and after wood treatment (if any), apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces "flood-coated" for not less than 10 minutes.

G. Seal Coat: After fabrication and sanding of each unit, and end- coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where treatment has included a water repellent.

2.03 FACTORY APPLIED PROTECTION

A. Before shipping or exposing to outdoor conditions, individually wrap each member with manufacturer's standard, opaque, durable, water-resistant, plastic-coated paper covering, with water- resistant seams.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Submit fabrication certificates to the building officials prior to installing glued laminated structural units.

B. Contractor shall verify all cambers prior to installation. Installation of members shall indicate contractor's acceptance of camber's and materials as specified.

C. General: Install miscellaneous steel connectors, anchors, and accessories.

D. Plan and execute erection procedures so that close fit and neat appearance of joints and structure as a whole will not be impaired. When hoisting members into place, use padded or non-marring slings, and protect corners with wood blocking.

E. Adequately brace members as they are placed to maintain safe position until full stability is provided.

F. Cutting: Avoid cutting glulam members during erection, to greatest extent possible. Except for fastener drilling and other minor cutting, coat cuts with end sealer as specified for "Fabrication".

1. Where treated members must be cut during erection, apply a heavy brush coat of the same preservative treatment, complying with AWPA Standard M4.

G. Handle and temporarily support members to prevent visible surface damage.

H. Do not remove wrapping on individually wrapped members until it will serve no useful purpose, including protection from weather, soiling and damage from work of other trades.

1. Coordinate removal of wrapping with finishing work specified in Division 9. Retain wrapping wherever it can serve as a painting shield.

I. Repair damaged surfaces and finishes after completion of erection and removal of wrappings, or replace damaged members as directed where damage is beyond acceptable repair, or where damage is unacceptable in exposed conditions.

3.02 PROTECTION

A. Advise Contractor of necessary limitations on heating, ventilating and air conditioning in building, in order to avoid damage or deterioration of glulam work.

END OF SECTION

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SECTION 06 19 00

MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Framing with dimension lumber (also see Section 06 10 00).
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants, and nailers.
4. Wood furring and grounds.
5. Wood sleepers.
6. Installation of Interior wood trim and plywood paneling not specified elsewhere.
7. Plywood backing panels.
8. Installation of Finish Door Hardware furnished by others.
9. Wood backing for wall & ceiling mounted fixtures & equipment.
10. Finish plywood paneling.

B. Related Sections include the following:
1. Division 06 Section 06 10 00 "Rough Carpentry" for structural framing material and procedures which take precedence over requirements of section 06 19 00 in case of conflict.
2. Division 06 Section 16 40 00 "Interior Architectural Woodwork" for Interior Woodwork and cabinetry.

1.02 REFERENCES

A. FSC – Forest Stewardship Council Principles and Criteria.

B. ANSI/ASME B18.6.1

1.03 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NHLA: National Hardwood Lumber Association.
3. NLGA: National Lumber Grades Authority.
4. WCLIB: West Coast Lumber Inspection Bureau.

5. WWPA: Western Wood Products Association.

1.03 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
   1. Preservative-treated and Fire-retardant treated wood.
   2. Power-driven fasteners.
   3. Powder-actuated fasteners.
   4. Expansion anchors.
   6. Metal framing anchors.

1.04 QUALITY ASSURANCE

A. Erector Qualifications: All work to be organized and directed by an experienced, competent carpentry supervisor; and performed by skilled workers experienced with similar work for public school projects.

B. Requirements of Regulatory Agencies, Codes: Conform to 2013 CBC, Part 2. Chapter 23, and 2005 ANSI/AF & PA NDS.

C. Allowable Tolerances; Framing Alignment: 3/16" maximum permissible variation from true plane measured from 10' straight edge; 1/8" maximum variation between any two adjacent farming members.

D. Source Quality Control; Grade Marks: Identify all lumber and plywood by official grade mark of an approved agency.

E. Standards
   1. Grading: In accordance with Section 06 10 00.
   2. Preservative Treatment
      a. CBC, 2303 1.8 based on various Standard Specifications of American Wood Preservers Bureau (AWPB); Quality Mark by Association approved Agency. AWPA, Standard U1 and M4. Preservative shall be listed in Section 4 of AWPA U1.

F. All Plywood shall be free of urea-formaldehyde binders and adhesives.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

C. Certified wood shall be kept separate from non-certified wood. Auditing process as mandated by certifiers shall be complied with.

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete within 8" of exposed soil or exposed to weather.

2.03 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

B. Non-Load-Bearing Interior Partitions: No. 2 grade or better of any species.

C. Other Framing: No. 2 grade and any of the following species:
1. Douglas fir-larch; WCLIB or WWPA.
2. Spruce-pine-fir; NLGA.
3. Hem-fir; WCLIB or WWPA.

2.04 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species, at time of installation unless indicated otherwise.

C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.05 INTERIOR WOOD TRIM AND PLYWOOD PANELING

A. General: Provide kiln-dried finished (surfaced) material without finger-jointing, unless otherwise indicated.

B. Lumber Trim for Opaque (Painted) Finish: Either finger-jointed or solid lumber, of one of the following species and grades:
1. Grade Finish eastern white pine; NeLMA or NLGA.

C. Plywood Paneling: 5/8" ACX Birch Veneered or as indicated on drawings.

2.06 CONCEALED, PERFORMANCE-RATED STRUCTURAL-USE PANELS

A. General: Where structural-use panels are indicated for the "following concealed types of applications," provide APA-performance-rated panels complying with requirements of specification Section 06 10 00 and as

designated under each application for grade, span rating, exposure durability classification, and edge detail (where applicable).

1. Thickness: Provide panels meeting requirements specified but not less than thickness indicated.
2. Span Ratings: Provide panels with span ratings required to meet "Code Plus" provisions of APA Form No. E30,"APA Design/Construction Guide: Residential & Commercial."

2.07 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements of specification section 06 10 00 and as specified in this Article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
   2. Fasteners shall be installed with proper means and methods, in properly sized holes and locations as detailed.
   3. Nails for attachment of plywood or OSB wall sheathing to sill plates on concrete slabs and footings at or within 8" of exposed soil shall be hot-dipped zinc coating per ASTM A153.

B. Nails, Brads, and Staples: ASTM F 1667.
   1. All nails shall be Common Wire Nails unless otherwise specified. Box, casing or other nails shall not be used unless specifically referenced.
   2. Nails, Spikes and Staples: Section 2304.9 CBC, Galvanized for exterior exposed applications, high humidity locations and installation into treated wood; plain finish for other interior and protected locations; size and type to suit application and as specified. Comply with Table 2304.9.1 unless detailed otherwise. Use common nails only.

C. Powder-Driven Fasteners: ICC ESR-2269.
   1. HILTI X-U drive pins of lengths indicated for application required. Designated lengths shall be verified with the supplier for proper application prior to installations.

D. Wood Screws: ASME B18.6.1.
   1. Connecting wood to wood: Wood screws shall be pre-drilled. The lead hole receiving the shank shall be no more than 7/8 of the shank diameter. The lead hold receiving the threaded portion shall no more than 7/8 the diameter of the shank at the threaded portion. Wood screws shall not have upset threads. Decking screws are not allowed. Soap or other lubricant may be used on wood screws to facilitate insertion.
   2. Connecting plywood to light gauge steel: Self-drilling, flat Phillips head, zinc-plated steel screws.
   3. Connecting plywood to steel shapes: Thread cutting, flat Phillips head, zinc-plated steel screws with blunt points and tap-fluted pilots.

E. Lag Bolts: ASME B18.2.1. – A 307. See structural drawings for lead hole requirements.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and flat washers to all wood surfaces at heads and nuts.

G. Fasteners: Expansion type or powder actuated type for anchorage to solid masonry or concrete. Refer to Division 01, General Requirements for acceptable types and required testing. Where installation and torque verification of wedge-type anchors is inspected by the IOR, testing of anchors will not be required unless directed by the SEOR for structural tension applications.

H. Machine-Driven Nailing Approval Procedure:
   1. Should Contractor wish to use machine-driven nailing, he shall make specific written request, prior to beginning nailing work, for approval of exact fasteners, equipment, and methods proposed.
   2. Request will be reviewed by Architect/Engineer and Division of the State Architect (DSA).
   3. Approval, if given, will be in writing, subject to satisfactory field performance.
      a. Use of machine nailing is subject to a satisfactory job-site demonstration for each Project and approval by Architect or Structural Engineer and DSA. The approval is subject to continued satisfactory performance. Machine nailing will not be approved in 5/16" plywood. If nail heads penetrate the outer ply more than would be normal for a hand hammer or if minimum allowable edge distances are not maintained, the performance will be deemed unsatisfactory.

I. Metal Framing Anchors:
   1. General: provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
      a. Standard manufactured, stamped or formed steel, galvanized; types indicated for specific uses; complete with nails.

2.08 MIXES – DRYPACK /GROUT

A. Mix Proportions: One part Portland cement, 1-1/2 parts sand.

B. Mixing: With sufficient water to make a stiff mixture, which can be molded, into a sphere.

C. Strength: Minimum 5,000 psi compressive strength.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Do not splice structural members between supports, unless otherwise indicated.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
   1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

E. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities of wood framed construction as indicated and as follows:
   1. Fire block concealed spaces of wood-framed walls and partitions at not more than 120 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.

F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. HILTI for powder-driven fasteners, Type X-DN1 for sill plate to concrete.
   2. Table 2304.9.1, "Fastening Schedule," in the California Code of Regulations, 2013 California Building Code.

I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or

will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated. Nail heads may be flush with plywood surface but shall not penetrate the second lamination layers.

3.02 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.03 ALIGNMENT

A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

B. Provide solid furring strips of plywood (or hardboard where less than ¼" thick) over framing member as required to match differing thicknesses of framing members where installing new framing in existing walls and/or to provide flush finished surfaces.

3.04 WOOD TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.
   1. Match color and grain pattern across joints.
   2. Install trim after gypsum board joint-finishing operations are completed.
   3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads and fill holes.
   4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

B. Install plywood paneling full length, in the vertical direction.

1. Fasten with 8d finish nails @ 6" o.c. edges and 12" o.c. in field.
2. Provide horizontal blocking @ top of panel for nailing of paneling and drywall, and provide full length vertical blocking for all vertical joints of paneling.

3.05 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

3.06 FINISH HARDWARE INSTALLATION

A. This section is applicable to the installation of finish hardware where not specifically covered by other specification sections for the doors and/or frames upon which hardware is to be installed.

B. Site verification of conditions:
   1. Prior to the execution of the work under this specification section, inspect the installed work executed under other specification sections of this Project Manual which affect the execution of the work under this specification section.
   2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
   3. Execution of work under this specification section shall constitute acceptance of existing conditions.

C. Coordination:
   1. Coordinate the work under this specification section with work specified under other specification sections prior to walls and ceilings being closed in with finish materials to ensure proper and adequate interface of work specified under this specification section.
      a. Coordinate electrical power needs for those hardware items requiring electrical interface.
      b. Coordinate electrical alarm needs (security, fire/smoke detection) for those hardware items requiring electrical alarm interface.
   2. Obtain all required hardware templates.

D. Surface preparation:
   1. Prepare surface in accordance with manufacturer's instructions and recommendations.
   2. Coordinate the blocking required for all wall mounted hardware.

3. Clean substrates of substances (oil, grease, rolling compounds, incompatible primers, loose mill scale, etc.), which could impair bond of materials specified within this section.

E. Installation:
   1. Install in accordance with manufacturer's instructions and recommendations unless specifically noted otherwise.
      a. Hardware distributer shall assist and advise installer in correcting field problems arising during installation of hardware.
      b. Hardware distributer shall be on Project within 48 hours upon being notified by the Contractor.
      c. Hardware distributer shall assist installer in the proper adjustment of all door closers, and other operating devices.
   2. Install in accordance with approved shop drawings.
   3. Install in accordance with regulatory requirements including latest edition of California Disabilities Act Guidebook (CalDAG).
   4. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by the Architect.
      a. Steel Doors and Frames: "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames: by the Door and Hardware Institute.
      b. CBC Chapter 11B and Cal DAG, latest version.
      c. Door opening devices shall be installed at 30" minimum to 44" maximum height.
   5. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where indicated and where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections.
      a. Do not install surface-mounted items until finishes have been completed on the substrate involved.
   6. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
   7. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
   8. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 Section "Sealants and Caulking."
   9. Weather-stripping and seals shall comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

F. Field Quality Control Inspection:
   1. Contractor shall inspect all hardware to assure that is was installed correctly and is in proper working order.
   2. The Contractor shall schedule an inspection prior to substantial completion, and notify the Owner's Inspector and any regulatory agencies of the time 48 hours prior to the inspection.
      a. The inspection shall cover checking all locks and verifying that they have been installed in accordance with the hardware schedule and the keying schedule.

G. Adjusting:
   1. Adjust and check each operating item of hardware and each door to ensure proper operations or function of every unit.
      a. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
         (1) Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area.
         (2) Clean operating items as necessary to restore proper function and finish of hardware and doors.
         (3) Adjust door control devices to compensate for final operations of heating and ventilating equipment.

H. Cleaning:
   1. Clean in accordance with Specification Sections 01 74 00 – Cleaning and 01 77 00 – Project Closeout.
   2. Clean any adjacent soiled surfaces by hardware installation immediately.
   3. Finish shall be clean and ready for the application of any additional finishes.

I. In accordance with Specification Section 01 77 00 – Project Closeout.
   1. Provide the services of a factory-authorized service representative to demonstrate and train Owner's maintenance personnel as specified below.
      a. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

END OF SECTION

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SECTION 06 19 60

PRE-FABRICATED WOOD "I" JOISTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Pre-fabricated wood "I" joists.

1.03 REFERENCES

A. Comply with the applicable provisions of the following codes and standards as follows:

1. International Code Council (ICC): California Building Code, 2013 edition.
2. American society for testing and Materials (ASTM): D 5055-90 Establishing and Monitoring Structural Capacities of Prefabricated Wood "I" Joists.
3. I-Joist product design information.
4. ICC ESR report for I-joist product to be supplied.

1.04 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

B. Product data: Within 35 calendar days after the Contractor has received the owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
2. Shop Drawings showing pertinent details of the units and their interface with other components of the structure.
3. Manufacturer's recommended installation procedures.
4. Plan layout of members, design loads and installation instructions.
5. Structural calculations signed by a California registered Civil Engineer.
   a) Calculations shall illustrate structural design of each type of joist. Refer to drawings for load conditions and allowable stress increases.

b) Calculations: Originals shall be prepared by and signed by a Civil or Structural Engineer registered by the State of California.
c) Submit one "wet signed" set and three copies.

1.05 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. These products shall be designed and manufactured to the standards set forth in the appropriate ICC ESR report for the product supplied, and shall conform to all DSA IR specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01620.

B. Deliver materials of this Section to the job site in bundles banded together for handling and shipping.

1.07 WARRANTY

A. The products supplied shall be free from any manufacturing errors or defects in workmanship and material. The design of members shall be adequate to carry the loads specified by the purchaser for the normal and expected life if the specified project.

B. Joist manufacturer shall be responsible for the engineering design, fabrication, and in-place performance of I-Joists and related components.

PART 2 - PRODUCTS

2.01 PREFABRICATED WOOD CHORD JOISTS

A. Design is based on ICC approved products of the manufacturer's listed. Equal products of other manufacturers will be acceptable with appropriate "Request For Substitution" and when approved by the Architect. Substitutions shall comply with all requirements of the drawings. Products for substitution shall be of a type and size accommodating the detail requirements of the project, as indicated in the drawings.

B. GENERAL:

1. Size and detail the work of this Section to fit the dimensions and loads indicated on the Drawings.
2. Design in accordance with allowable values and section properties assigned and approved by the governmental agencies having jurisdiction.
3. Deflection limits shall apply when specified on the structural drawings.

C. Provide "I-joist" units, factory made with structural grade plywood or OSB webs, "LVL" flanges, and utilizing waterproof type glues. No material substitutions will be accepted.

1. Flanges: Laminated Veneer Lumber (LVL) of sizes indicated on structural drawings, manufactured according to the manufacturing standards specified in ICC Report. Moisture contents shall be between 7 and 16 percent. Flanges to be one continuous piece with no splices.
2. Webs:
   a) Web material may be CD Structural 1 plywood with exterior glue, grade marked by APA, in accordance with Product Standard PSI-83, or Oriented Strand Board (OSB).
   b) Webs shall be fully glued at splices.
   c) Tapered I-Joists shall have plywood webs.
   d) Thickness of webs shall be minimum sizes as specified on the referenced manufacturers' ICC report for the model of joist indicated.
3. Adhesives shall be of the types specified in the TrusJoist manufacturing standards and which comply with ASTM D2559-79.
4. Web Stiffeners and Blocking Panels: Comply with details and dimensions as shown on the drawings and in shop drawings. All stiffeners and blockings shall be delivered the jobsite in one assembled piece ready for installation directly to the joists.
5. Metal Bridging shall be 18 gauge "TB-tension bridging" (nail type) as manufactured by Simpson Strong-Tie Company, Inc. or USP Connectors.

2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.03 ALTERNATES OR EQUALS

A. Manufacturers: As specified herein with properties and materials as specified on the structural drawings. Manufacturer's products shall have current ICC approval. Other manufacturers not listed will be considered by proper submittal through the Request For Substitution process.

1. Red Built (ICC ESR-2994)
2. Boise Cascade (ICC ESR-1336)
3. Roseburg (ICC ESR-1251)

B. Due to the customized detailing and engineering characteristics of the specified framing assemblies, I-joist metal hangers and accessories have been specified according to the joist sizing and geometry of the listed manufacturer's products as indicated on the structural drawings. 'Alternative products' of sizes not compatible with the hangers and accessories specified will require alternate hangers and accessories to be submitted to the Architect for review and approval.

C. Alternative products will be considered for approval as an alternative provided the proper substitution procedures have been followed, and the following items meet or exceed that specified:

1. Allowable bending moment.
2. Allowable shear strength.
3. Moment of inertia.
4. Modulus of elasticity.
5. Manufacturing tolerances.
6. ICC approval.
7. Compatible flange and web materials.
8. Compatible stiffeners and blockings in one piece, ready for installation.

D. Alternative products, in order to be considered, shall have all details, plans, engineering and other affected items submitted and coordinated in a timely fashion, including notice for the added inspection requirements (if necessary) so as to not delay the project.

1. Use of an alternate product may require additional DSA plan check fees and an Architect/Engineer of Record shop drawing review and revised design fee to accommodate the substitution, to be paid for by the Contractor.

E. Substituted product dimensions, materials, fabrications and alternative details shall be compatible with the other related components of the total structural system and shall have all appropriate acceptances and approvals.

2.04 FABRICATION

A. All Joists produced shall be manufactured under the supervision of a third party inspection agency in accordance with CBC Section 1704.2.5 unless fabricator is an "Approved Fabricator" in accordance with CBC, section 1704.2.5.2. Continuous inspections during fabrication, if required, will be provided and paid for by the Owner, but deducted from the payments to the Contractor.

B. Each joist produced shall be identified by a stamp indicating the joist type, ESR report number, manufacturer's name, plant identification and the PFS Corporation logo.

C. Web splices shall be fully glued and shall transfer vertical shear forces through the splice.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install the work of this Section in strict accordance with the Shop Drawings and manufacturer's recommendations as approved by the Architect.

B. Procedures:

1. Erect and install in accordance with the approved shop drawings.
2. Do not impose temporary construction loads, which cause stresses beyond design limits.
3. Erect bracing and bridging as required to maintain the units straight and plumb and as required for net uplift load conditions.
4. Assure adequate lateral support for installation means & methods until the sheathing material has been applied.
5. Contractor is responsible for the execution of all erection procedures to assure proper and safe installation of joists.

C. Hammering on the inside of flanges (away from the web) is not permitted.

D. Nails or screws into the sides of the flange, for purpose of supporting pipe, ceiling, or other loads, will be permitted only as detailed on the approved shop drawings.

E. Hanging of pipe, ceiling, or other loads from the top or bottom flange shall only be by the method specifically detailed by the manufacturer, as accepted by ICC.

F. Cutting or Notching of the flanges is prohibited.

G. Holes cut into the web are not permitted unless such holes are specifically detailed and dimensioned on the shop drawings.

H. Provide mid-span bridging for I-JOIST spans exceeding 16'-0". Space bridgings per manufacturer's recommendations but not to exceed 16'-0" o.c.

I. Provide bridgings and bracings as indicated on the manufacturer's shop drawings.

3.03 FIELD QUALITY CONTROL

A. Tests and Inspections (See notes at paragraph entitled "Fabrication" for in-plant inspection requirements -if any)

1. The Contractor shall give notification to the Architect and to the Inspector of Record prior to enclosing the framing systems to provide for inspection of the installation.

B. The I-joist supplier or manufacturer shall have an experienced representative visit the site prior to covering the I-joists to verify that all joists, hangers and related components have been installed in general conformance to the manufacturer's requirements and specified project applications.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Interior standing and running trim.
2. Wood and Plastic-laminate cabinets.
3. Plastic-laminate and solid surface countertops.
4. Closet and Utility Shelving.
5. All Cabinet hardware for complete and proper operation.
6. Provide Woodwork Institute certification of all new cabinetry.

B. Related Sections include the following:
1. Division 05 Section "Metal Fabrications" for metal supports for installing woodwork.
2. Division 06 Section "Miscellaneous Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
3. Division 08 Section "Pre-Finished Wood Doors" for wood doors and wood frames.

C. Cabinet Locks:
1. Provide locking hardware for cabinetry doors and drawers as indicated by the schedule at the end of the section.

1.02 REFERENCES

A. California Title 17 Division 3 Subchapter 7.5 Air Bourne Toxic Control Measures, Section 93120.1 through 93120.12.

B. SCAQMD – South Coast Air Quality Management District Regulations Rule 1168 Adhesive and Sealant Applications.

C. SJVAPCD – San Joaquin Valley Air Pollution Control District regulations.

D. FSC – Forest Stewardship Council Principles and Criteria.

E. Green Seal Standard GS-36, Commercial Adhesives.

F. CHPS Low-emitting Materials list (http://ww.chps.net/manual/lem_table.htm).

G. Greenguard Children and Schools (http://www.greenguard.org/).

1.03 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated, including hardwood veneers, cabinet hardware and accessories and finishing materials and processes.

B. Product Data: For high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories, and finishing materials and processes.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   2. Show locations and sizes of cutouts and holes for plumbing fixtures faucets and other items installed in architectural woodwork.
   3. Apply WI-certified compliance label to first page of Shop Drawings.

D. Samples for Initial Selection:
   1. Shop-applied transparent finishes.
   2. Shop-applied opaque finishes.
   3. Plastic laminates.
   4. PVC edge material.
   5. Thermoset decorative panels.

E. Samples for Verification: (following final color selection):
   1. Lumber and panel products with shop-applied opaque finish, min. 12" long x width of material for lumber and 8 by 10 inches for panels, for each finish system and color, with 1/2 of exposed surface finished.
   2. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with 1 sample applied to core material with specified edge material applied to 1 edge.
   3. Thermoset decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish.

F. Product Certificates: For each type of product, signed by product manufacturer.

G. Woodwork Quality Standard Compliance Certificates: WI-certified compliance certificates.

H. Qualification Data: For fabricator.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a licensee of WI's Certified Compliance Program.

B. Installer Qualifications: Fabricator of products Licensee of WI's Certified Compliance Program.

C. Quality Standard: Unless otherwise indicated, comply with WI's "Architectural Woodwork Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
   1. Provide WI-certified compliance labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified. Provide shop preliminary inspection prior to delivery and in-place inspection following installation. Contractor shall pay all WI inspection/certification fees including follow-up of deficiencies.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.08 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide materials that comply with requirements of WI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Species and Cut for Transparent Finish: Provide AA white maple, plain sliced and of uniform color and grain pattern, or other equivalent species/grade as selected by Architect.

C. Wood Species for Opaque Finish: Any closed-grain hardwood.

D. Wood Products: Comply with the following:
   1. Hardboard: AHA A135.4.
   2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
   3. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.
   4. Softwood Plywood: DOC PS 1.
   5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

E. Thermoset Decorative Panels: At concealed locations only, it is acceptable to use particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
   1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges that match color and pattern of interior faces.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard at interior concealed and semi-exposed surfaces only, as indicated in drawings.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
      a. Formica Corporation.
      b. Nevamar Company, LLC; Decorative Products Div.
      c. Wilsonart International; Div. of Premark International, Inc.

G. Solid Surface Counters and Facing as indicated in drawings: Cut, formed, built-up and machined to shapes and dimensions indicated in drawings and in accordance with manufacturer's recommendations.
   1. Quartz Surfaces: ¾" thickness, color as selected by Architect. Submit full line from 3 manufacturers.

H. Glass counters, supports, shelving and related accessories, attachments etc. as indicated: Provided by Division 8 Section, Glazing. Coordinate for fit and attachment.

2.02 CABINET HARDWARE AND ACCESSORIES

A. Provide hardware as indicated on the Drawings and as listed in the Architectural Woodwork Standards, but no less than the following: (all hardware, where exposed to view) must be finished in a Brushed Chrome (Verify prior to ordering)
   1. Adjustable shelf standards and supports: Flush mounted
      a. LD 32mm line boring system 5 mm pins (under 32" wide).
      b. Knape and Vogt/No. 255 with No. 256 supports (shelving 32" and wider).
      c. Provide earthquake pins in back row or notch shelfs.
      d. 32 MM drilled hole system with steel pin shelf supports.
   2. Cabinet Hinges: Minimum 160° opening. Hinge type as selected by Owner & Architect.
      a. Rockford Process Control (RPC) or approved equal/5 Knuckle Hinges of wrap-around or overlay/specialty configuration to suit conditions for minimal exposure as approved by Owner.
      b. Frameless concealed hinges (European Type): BHMA A156.9, B01602, self-closing, adjustable.
   3. Cabinet Pulls: Wire type, 3 ½" center to center, Brushed Chrome.
      a. Baldwin Hardware manufacturing Corp./No. 4674
      b. Stanley hardware/No. 448 3 ½"
      c. The Engineered Products Co./No. MX-4023.5
      d. Amerock BP-867
   4. Drawer Slides: Full extension, 100 lb. capacity type with ball bearing steel rollers.
      a. Grass 6610
      b. Knape and Vogt/No. 1429
      c. Accuride 3832 (3834 at file drawers) – preferred product.
   5. Door and Drawer Locks (with pin tumblers):
      a. Door and drawer locks shall be National C-8173-915KA-26D and C-8178-915KA-26D respectively.
   6. Elbow Catches for inactive door at pair:
      a. Bradley Co. No. 2a-92 Ives A10
   7. Cabinet Door Latch System:
      a. Magnectic Catch: KV-916 (KV-918 on wardrobe doors).
      b. Friction Catch: 2120 FlexaCatch by Bainbridge.
      c. Slide Bolt: Surface Bolt by Quality Hardware.
   8. Chain Bolts:
      a. Stanley 1055 3"
   9. Flipper Door Slide: Install with appropriate bumpers and bearings so as door is not adversely affected by operation nor does the hardware contact the face of the door.
      a. Grant #513

b. Accuride #113 – preferred product
10. Label holders indicated)
    a. Brainerd 0736 – B.P.
11. Lock number tag
    a. MCS 89602
12. Wardrobe Hanger Rod
    a. Hettich oval 2mm x 15mm nickel plated w/009-033 sockets injection molded Plastic Cable Grommet (hole cover) Hafele America Co./No 429-99 series 40mm with outer ring and cover other as available.
13. Toe Kicks (door mounted) at wheelchair accessible, knee space doors.
    a. PF Toe Kick (Sunbelt Displays, 1-888-999-7003) with setback to match cabinets for adhesive attachment of rubber topset base to be provided by flooring contractor.
14. Glass Door Lock:
    a. KV 965 (opening size under 16 square ft.).
    b. National C-8140 Pin Tumbler (opening size 16 square ft. or larger).
15. Sliding Glass Door Track:
    a. KV 1092 (opening size under 16 square ft.).
    b. KVP-992 roll easy (opening size 16 square ft. or larger).
16. Support (Glass Shelves): KV #256-R or LD-KV348.
17. Sliding Glass Door Pull: KV #831 or Mepla 70.1.
18. Counter Top Hinge--Soss #204.

B. Grommets for Cable Passage through Countertops: 2-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
    1. Product: Subject to compliance with requirements, provide "OG series" by Doug Mockett & Company, Inc.

C. Exposed Hardware Finishes: Brushed chrome or as otherwise indicated or selected by Architect.

D. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.03 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

D. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) or other latest adopted regulations:
   1. Wood Glues: 30 g/L.
   2. Contact Adhesive: 250 g/L.

E. Adhesive for Bonding Plastic Laminate: Resorcinol, unpigmented contact cement.
   1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.04 FABRICATION, GENERAL

A. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard except provide Premium grade at hardwood veneer cabinets and at laminated plastic casework with visible/open interiors. Construct all floor supported cabinets with integral base/toe kick.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
   2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.

D. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
   1. Seal edges of openings in countertops with a coat of varnish and waterproof sealant.

2.05 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

A. Grade: Premium.

B. Wood Species and Cut: White Maple, plain sliced, no knots.

C. For trim items wider than available lumber, use veneered construction. Do not glue for width.

D. Backcut or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

E. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.06 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

A. Grade: Custom.

B. Wood Species: Any closed-grain hardwood.

C. Backcut or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

D. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.07 PLASTIC-LAMINATE CABINETS (only where indicated)

A. Grade: Custom, with upgraded requirements as indicated.

B. WI Type of Cabinet Construction: Flush overlay.

C. WI Construction Style: Style A, Frameless.

D. WI Construction Type: Type I, multiple self-supporting units rigidly joined together.

E. WI Door and Drawer Front Style: Flush overlay.

F. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
   1. Horizontal Surfaces Other Than Tops: Grade HGS, Nominal 0.048".
   2. Post-formed Surfaces: Grade HGP, Nominal 0.039".
   3. Vertical Surfaces: Grade HGS, Nominal 0.048".
   4. Edges: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish. Door and drawer edges to be 3 mm solid color PVC as selected by Architect.
   5. Color, Pattern & Finish: Match adjacent existing cabinetry or be complimentary to it.

G. Materials for Semi-exposed Surfaces:
   1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
      a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.

b. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels, 1/2" thick.
3. Drawer Bottoms: Thermoset decorative panels, 1/2" thick.

H. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As selected by Architect from laminate manufacturer's full range of colors, patterns and finishes.

J. All open shelving and other cabinets shelving more than 30" wide shall be full 1" thick plastic laminate faced plywood (no particle board or melamine).

2.08 PLASTIC-LAMINATE COUNTERTOPS & SPLASHES (only where indicated)

A. Types and sizes:
1. Shop fabricate countertops and splashes to the types and dimensions shown on the Drawing. Custom Grade.
2. In wet areas where splashes are called for, provide 4" or higher (as noted) coved splash and square edges unless noted otherwise. Verify all edge types with Architect prior to fabricating. Where required to not interfere with electrical outlet locations, increase height of backsplash up to 10" as directed by Architect at no additional cost to eliminate interference problems.

B. High-Pressure Decorative Laminate Grade: HGP, Nominal .048".

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by manufacturer's designations.
2. Match Architect's sample.
3. As selected by Architect from manufacturer's full range of colors, patterns and finishes.

D. Edge Treatment: Same as laminate cladding on horizontal surfaces.

E. Core Material: Particleboard made with exterior glue.

F. Core Material at Sinks: Minimum 5-ply plywood made with exterior glue.

G. Paper Backing: Provide paper backing (adhered and sealed)on underside of countertop substrate.

2.09 CLOSET AND UTILITY SHELVING

A. Grade: Custom.

B. Shelf Material: Full 1-inch thermoset decorative panel with PVC or polyester edge banding on plywood (no particle board).

C. Cleats: 3/4-inch thermoset decorative panel.

D. Opaque Finish:
1. Grade: Custom.
2. WI Finish System 2: Water-reducible acrylic lacquer.
3. Color: As selected by Architect from manufacturer's full range.
4. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

2.10 HARDWOOD CABINETS, TOPS & COMPONENTS

A. Grade: Premium

B. Provide as indicated in Contract Documents with shop applied transparent finish in accordance with Division 9 Section “Painting”.

PART 3 - EXECUTION

3.01 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.

3.02 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to concrete, metal strapping or wood blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated. Comply with anchorage details in drawings.

F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
   1. Stagger joints in adjacent and related standing and running trim.
   2. Cope at returns and miter at corner to produce tight-fitting joints with full surface contact throughout length of joint.
   3. Use scarf joints for end to end joints.
   4. Match color and grain pattern across joints.
   5. Install trim after gypsum board joint-finishing operations are completed.
   6. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads and fill holes with wood putty matching wood surface, and sand smooth.
   7. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
   8. Install wall railings on indicated metal brackets securely fastened to wall framing.
   9. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Maintain veneer sequence matching of cabinets with transparent finish.
   3. Fasten wall cabinets through back, near top and bottom, within 3" of cabinet ends and not more than 12 inches o.c. with No. 14 wafer-head screws sized for 1-inch penetration min. 16 GA. Steel strapping or 1-1/2-inch penetration into wood framing, blocking, or hanging strips. Anchors into concrete walls/curbs/floors shall be 3/8" dia. Hilt6i Kwick Bolt TZ or Simpson Strong-Bolt 2 expansion bolts with 2" embedment.,

H. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Anchor solid surface tops with low voc adhesive.
   1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

2. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
3. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

I. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

J. Refer to Division 09 Sections for final finishing of installed architectural woodwork not indicated to be shop finished.

3.03 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.04 CABINET LOCK SCHEDULE:

A. Provide locks at doors and drawers as described elsewhere in this section at the following locations (verify specific door/drawers w/Owner):

As indicated on drawings.

END OF SECTION

FIBERGLASS REINFORCED PLASTIC PANELS

SECTION 06 80 82

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Fiberglass reinforced plastic wall panels (FRP) and trim accessories.

B. Related Sections:
   1. Division 9 Section "Gypsum Board" for material finish used as a base for FRP installations.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated along with manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. Product Data: For the following:
   1. Fiberglass reinforced plastic panels.
   2. Trim.
   3. Adhesives.

C. Samples for Selection: For full range of color and texture of fiberglass reinforced plastic panel available, include trim.

D. Samples for Verification: For each type of fiberglass reinforced plastic panel selected.
   Size shall be 4"x4" minimum for panels and 4" long trim pieces.
   1. Include trim Samples to verify color selected.

E. Maintenance Data: For fiberglass reinforced plastic panels to include in maintenance manuals.

1.03 QUALITY ASSURANCE

A. Source Limitations: Obtain fiberglass reinforce plastic panels and trim through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide fiberglass reinforced plastic panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.
   3. Testing Agency: UL or equivalent.

1.04 PROJECT CONDITIONS

A. Environmental Limitations: Do not install fiberglass reinforced plastic panel system until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify wall locations and door and window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating wall panels without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   1. Fiberglass Reinforced Plastic Panels:
      a. Kemlite, Fire X Glasboard.
      b. Nudo Products Inc., LP- F9-FR Fiber Lite Liner Panels.
      c. Sequentia, Fire Retardent Wall and Ceiling Panels

2.02 MATERIALS, GENERAL

A. Fiberglass Reinforced Plastic Panels:
   1. Thickness: 0.09 inches
   2. Size: 4 foot width x required height for application.
   3. Fire Classification: Class A.
   4. Texture: Pebble embossed exposed side and smooth back side.
   5. Color: As selected from manufacturer's full line of available colors.

2.03 ACCESSORIES

A. Trim: Polyvinyl chloride moldings:
   1. Inside and Outside corners.
   2. Division bars.
   3. Caps.
   4. T bar.
   5. Nylon drive rivets.

B. Adhesive: Structural construction adhesive compatible with substrates to be applied to substrate and FRP materials.

C. Sealant: Single component, mildew-resistant, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Division 07 Section "Joint Sealants" compatible with FRP materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for , installation tolerances, and other conditions affecting performance of work

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.

B. Clean substrates of substances that could impair bond of adhesive, including oil, grease, paint or other flaking materials, dirt, and dust.

C. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

D. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.
   1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
   2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.03 FIBERGLASS REINFORCED PANEL INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions, setting panels straight, plumb, level, and true to the lines and levels shown on the Drawings. **NO HORIZONTAL JOINTS ALLOWED** (unless overall height exceed 10').

B. Start installation from a corner and work progressively around the room. Allow at least 1/16" in the molding joint for expansion. Do not force panels tightly together. Provide means for leveling panels so that they are installed vertical. Extend panels continuously behind cabinets and other surface-mounted items, unless otherwise indicated.

C. Cutting: Cut and drill panels with carbide tipped blades and drill bits.

D. Expansion Provisions: Provide panel expansion gaps as recommended by manufacturer for trim pieces and adjacent construction.

E. Anchorage:
   1. Adhesive Installation: Apply adhesive with trowel for 100% coverage as recommended by adhesive manufacturer.
   2. Adhesive and rivet installation:
      a. Layout and install trim pieces
      b. Measure and cut panels to fit application. Maintain uniform space between panels and wall fixtures. Fill space with sealant. Drill rivet holes 1/8 inch larger than rivet size prior to lying up.
      c. Apply adhesive to substrate for 100% coverage as recommended by adhesive manufacturer.
      d. Apply sealant in trim pieces and insert panels with joint gaps specified for joint type by manufacturer.
      e. Install rivets in pattern as recommended by manufacturer.

   3. Rivet installation:
      a. Layout and install trim pieces.
      b. Measure and cut panels to fit application. Maintain uniform space between panels and wall fixtures. Fill space with sealant. Drill rivet holes 1/8 inch larger than rivet size prior to lying up.
      c. Apply sealant in trim pieces and insert panels with joint gaps specified for joint type by manufacturer.
      d. Install rivets in pattern as recommended by manufacturer.

3.04 CLEANING AND PROTECTION

A. Cleaning: Remove adhesives and sealants from FRP and trim with cleaning materials recommended by manufacturer of cleaning materials and as accepted by FRP manufacturer.

B. Replacement: Panels exhibiting air bubbles or delaminating from substrates due to not providing adequate expansion controls, installation prior to adequate environmental controls being in place or poor workmanship shall be replaced at no additional cost to the Owner.

C. Remove surplus materials, rubbish, and debris resulting from installation upon completion of work, and leave areas of installation in neat, clean condition.

END OF SECTION

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SECTION 07 11 13

BITMINOUS DAMPPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Cold applied water based emulsified asphalt dampproofing for exterior below grade foundations.
2. Cold applied water based emulsified asphalt vapor retarding coating for exterior above grade planter walls.

B. Related Sections:
1. Section 03 30 00 - Cast-in-Place Concrete.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements: Provide material complying with the following requirements:
1. Nonflammable.
2. VOC Content:
a. 0.25 pounds per gallon (30 g/L) less water and exempt solvents.
3. Service Temperature Range:
a. Minus 40 degrees F (Minus 40 degrees C) to 150 degrees F to (66 degrees C).
4. Compliance:
a. Brush, roller and spray applied fiber free Hydrocide 600 complying with ASTM D1187, Type 1, and ASTM D1227, Type 3, Class I.
b. Brush, roller and spray applied short fiber reinforced Hydrocide 700B complying with ASTM D1227, Type 2, Class I, and ASTM D1187, Type 1.

1.03 SUBMITTALS

A. Comply with Section 01 33 00.

B. Product Data: Submit manufacturer's technical bulletins and MSDS on each product.

C. Submit list of project references as documented in this Specification under Quality Assurance Article. Include contact name and phone number of person charged with oversight of each project.

D. Quality Control Submittals:
1. Provide protection plan of surrounding areas and surfaces not to receive damproofing.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Company with minimum 10 years of experience in manufacturing of specified products and systems.
   2. Applicator Qualifications: Company with minimum of 5 years experience in application of specified products and systems on projects of similar size and scope, and is acceptable to product manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 61 00,

B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

1.06 PROJECT CONDITIONS

A. Environmental Requirements:
   a. Keep from freezing in the container.
   b. Do not apply at temperatures below 40 degrees F (4 degrees C) or when temperatures are expected to fall to 40 degrees F (4 degrees C) within 24 hours.
   c. Protect from rain until coating has set.
   d. Application shall be protected or covered within 7 days of application.
   e. Do not expose to long-term UV.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products from the following manufacturer:
   1. BASF Building Systems
      889 Valley Park Drive
      Shakopee, MN 55379
      Customer Service: 800- 433-9517
      Technical Service: 800-243-6739
      Direct Phone: 952-496-6000
      Internet: http://www.BASFbuildingsystems.com

B. Substitutions: Comply with Section 01 25 00.

C. Specifications and Drawings are based on manufacturer's proprietary literature from BASF Building Systems. Other manufacturers shall comply with minimum levels of material, color selection, and detailing indicated in Specifications or on Drawings. Architect will be sole judge of appropriateness of substitutions.

2.02 MATERIALS

A. Cold applied water based emulsified asphalt:
   1. Non-fibrated Product: Hydrocide 600 by BASF Building Systems.
   2. Short-fiber Fibrated Product: Hydrocide 700B by BASF Building Systems.

B. Protection Board: Asphalt coated fiberboard with top edge fully coated.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. Protect adjacent Work areas and finish surfaces from damage during damproofing application.

B. Surface should be free of oil, grease, dirt, laitance, and loose material. Dry surfaces shall be dampened with water and kept damp until application.

3.02 APPLICATION

A. EXTERIOR SURFACES BELOW GRADE
   1. 3-Coat System:
      a. Apply prime coat of asphalt emulsion of Hydrocide 600 non-fibrated material, cut 20 percent by volume with clean water. Allow prime coat to dry tacky to touch and apply 1 coat of short fiber fibrated material.
      b. Fill in crevices and grooves, providing continuous coating and free from breaks and pinholes. Carry coating over exposed top and outside edge of footing. Spread around joints, grooves, and slots, and into chases, corners, reveals, and soffits. Bring coating to finished grade.
      c. Second Coat: Within 24 hours, apply Hydrocide 700B at rate of one gallon per 35 SF. Allow to dry tacky to touch.
      d. Third Coat: Within 24 hours, apply Hydrocide 700B same as second coat. Allow at least 48 hours, but no more than 96 hours before backfilling.
      e. Place backfill at least 24 to 48 hours after application, but within 7 days. Do not rupture or damage film or displace coating or membranes.

B. At walls against building areas install below grade protection board immediately following curing of final coat of Hydrocide 700B. Do not allow dirt, rocks or debris between dampproofing membrane and protection board. Locate top edge of protection board 1" to 2" below finish grade of earth at face of wall.

3.03 CLEANING

A. Clean tools and equipment immediately with hot, soapy water. Cured material can be removed with solvent.

B. Clean up and properly dispose of debris remaining on Project site related to application.

C. Remove temporary coverings and protection from adjacent Work areas.

3.04 PROTECTION

A. Protect application from damage during construction.

END OF SECTION

SECTION 07 13 13

SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Modified bituminous sheet waterproofing for installation below roofing, sheet metal and plaster assemblies where indicated.
   2. Coodinate installation of self-adhering sheet waterproofing with installers of adjacent finisher and sheet metal flashing,

1.02 SUBMITTALS

A. Product data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For the following products:
   1. 12-by-12-inch square of waterproofing and flashing sheet.

D. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

E. Qualification Data: For Installer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for waterproofing.

G. Warranties: Special warranties specified in this Section.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: A firm that is acceptable to waterproofing manufacturer for installation of waterproofing required for this Project.

B. Source Limitations: Obtain waterproofing materials through one source from a single manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.

C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

D. Store rolls according to manufacturer's written instructions.

E. Protect stored materials from direct sunlight.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
   1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

PART 2 - PRODUCTS

2.01 SHEET WATERPROOFING

A. Rubberized Asphalt Sheet: Not less than 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to a 8-mil-thick, polyethylene film with release liner on adhesive side and formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
   1. Products: Grace Perm-A-Barrier Wall Flashing:
   2. Physical Properties:
      a. Tensile Strength: 800 psi minimum; ASTM D 412, Die C, modified.
      b. Ultimate Elongation: 200 percent minimum; ASTM D 412, Die C, modified.
      c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970.
      d. Puncture Resistance: 80 lbf minimum; ASTM E 154.
      e. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D 5385.
      f. Water Absorption: 0.10 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
      g. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.
   3. Provide at all exterior wall door, window, louver openings and miscellaneous wall penetrations.

2.02 ROOF UNDERLAYMENT WATERPROOFING

A. Butyl Rubber Sheet: Not less than 30-mil- thick, cold applied, self-adhering sheet consisting a high density, cross laminated, polyethylene on one side with a butyl rubber adhesive film with release liner on adhesive side. Polyethylene surface is embossed slip resistance. Material is formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
   1. Products: Grace Ultra Underlayment:
   2. Physical Properties:
      a. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
      b. Ultimate Elongation: 250 percent minimum; ASTM D 412, Die C, modified.
      c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970.
      d. Adhesion to plywood 3.0 lbs./in width ASTM D903.
      e. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.
      f. Service Temperature: 300 degrees F per ASTM D1204.
   3. Provide below all metal roofing, edge flashing, valley, hip & ridge flashing and cap flashing as noted on drawings.

2.03 ROOF UNDERLAYMENT WATERPROOFING

A. Butyl Rubber Sheet: Not less than 40-mil- thick, cold applied, self-adhering sheet consisting a high density, cross laminated, polyethylene on one side with a butyl rubber adhesive film with release liner on adhesive side. Polyethylene surface is embossed slip resistance. Material is formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
   1. Products: Grace Ice & Water Shield HT Underlayment:
   2. Physical Properties:
      a. Tensile Strength: MD 33 I6/IN CD 31 16/IN; ASTM D 412, Die C, modified.
      b. Ultimate Elongation: 250 percent minimum; ASTM D 412, Die C, modified.
      c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970.
      d. Adhesion to plywood 5.0 lbs./in width ASTM D903.
      e. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.
      f. Service Temperature: 300 degrees F per ASTM D1204.
   3. Provide below all metal roofing, edge flashing, valley, hip & ridge flashing and cap flashing as noted on drawings.

2.04 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
   1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of sheet waterproofing material.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

D. Substrate Patching Membrane: Low-viscosity, two-component. asphalt-modified coating.

E. Sheet Strips: Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.

F. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

PART 3 – EXECUTION

3.01 EXAMINIATION

A. Examine substrates, areas, and conditions, with Installer present for compliance with requirements and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application. Obtain IOR inspection and acceptance of structural plywood decks and shear panels prior to beginning membrane installation.

B. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

C. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM 0 4258.

D. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
   1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

E. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.03 SHEET AND UNDERLAYMENT WATERPROOFING APPLICATION

A. Install waterproofing sheets and underlayment according to waterproofing manufacturer's written instructions and according to recommendations in ASTM D 6135. Provide sheet waterproofing over sheathed exterior walls that are

outward sloped for protection of the sheathing below plaster assemblies and in conjunction with sheet metal flashing at all wall openings and terminations. Provide roof underlayment waterproofing below all sheet metal roofing, roof flashing and roof caps.

B. Apply primer to required substrates at required rate and allow to dry. Limit priming to areas that will be covered by waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 3-1/2-inch- minimum side lap widths and 6" minimum end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40deg F, install self-adhering, modified bituminous sheets produced for low temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

D. Horizontal Application: Apply sheets from low point to high point of roof decks to ensure that side laps shed water.

E. Apply continuous sheets over sheet metal strips bridging substrate cracks, construction, and contraction joints.

F. Seal exposed edges of sheets at terminations not concealed by metal counterflashings or ending in reglets with mastic.

G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

H. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.04 PROTECTION AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

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SECTION 07 21 00

BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Concealed building thermal insulation.
   2. Sound attenuation insulation at wall and ceiling assemblies indicated.
   3. Vapor Retarder

B. Related Sections:
   1. Division 6 Sections "Rough Carpentry" and "Miscellaneous Carpentry."
   2. Divisions 20 through 23 for pipe and duct insulation.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.03 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Fire Resistance Rating: ASTM E119.

C. Thermal and Sound-insulating materials shall comply with CBC Section 719 and have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 (including vapor retarders).

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.01 GLASS-FIBER BATT/BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Unfaced, Glass-Fiber Thermal Batt/Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. The width of batts shall provide for a snug fit between framing members.
1. R-13: Exterior or interior framed walls or walls between conditioned and non- conditioned spaces where R-Value is not specified as greater, use with separate vapor retarder.
2. R-21: At all exterior 2x6 (or greater) framed walls, use with separate vapor retarder.

C. Kraft-Faced, Glass-Fiber Thermal Batt/Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier). The width of batts shall provide a snug fit between framing members.
1. R-21 (unless noted otherwise by the drawings): at exterior framed walls.
2. R-30 (unless noted otherwise by the drawings): at roof decks as indicated by the drawings in non-occupied attics where permitted by code.
3. Seal tight to interior face of wood or metal framing with adhesive tape. Leave minimum 2" air space between underside of roof deck and top of insulation.

D. Foil-Faced, Glass-Fiber Thermal Batt/Blanket Insulation: ASTM C 665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene. The width of batts shall provide a snug fit between framing members. Where exposed to view, provide black face and/or is suitable to be painted black.
1. R-21 (unless noted otherwise): at vertical attic walls installed up to the underside of insulated roof framing or deck.
2. R-30 (unless noted otherwise): at underside of roof deck. Provide width to fit snugly between rafters/joists.

E. Unfaced, Glass-Fiber Sound Isolating Insulation: ASTM C 665, Type I (for metal framing) and Type II (for wood framing), unfaced.
1. 3" minimum thickness by width to provide a snug fit between wall framing below and above ceiling levels.

2. Provide in all interior walls of sleeping rooms, toilet rooms, mechanical rooms (or provide thermal insulation), conference rooms, offices and elsewhere as indicated in drawings.

F. Verify type of insulation required to suit wood or metal materials and framing conditions and to securely hold in place and provide best product available, subject to approval of Architect.

2.02 OTHER INSULATION TYPES

A. Spray-on Cellulose Fiber Acoustic Insulation.
1. Celbar, 1-1/2" minimum thickness, STC 51 minimum rating at plumbing walls and in sound walls where tight, broken up spaces are difficult to insulate with batts.

2.03 VAPOR RETARDERS

A. Reinforced-Polyethylene Vapor Retarders: Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft., with maximum permeance rating of 0.0507 perm.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Raven Industries Inc.; DURA-SKRIM 6WW.
b. Reef Industries, Inc.; Griffolyn T-65.

B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

C. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, use NT related to exposure, and Use O related to vapor-barrier-related substrates.

2.04 BATT/BLANKET INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
b. Gemco; Spindle Type.
2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. AGM Industries, Inc.; SC150.
      b. Gemco; S-150.
   2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
      a. Attic spaces.

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. AGM Industries, Inc.; TACTOO Adhesive.
      b. Gemco; Tuff Bond Hanger Adhesive.

PART 3 - EXECUTION

3.01 PREPARATION & SCOPE

A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

B. Select the best insulation type and R-Value to suit building conditions and to provide a contiguous thermal envelope with minimum R-19 at perimeter walls full height up to R-30 minimum at roof deck or ceiling (at ventilated attics where indicated). Obtain direction form Architect in advance where conditions are not clear.

3.02 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.03 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Batt/Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
   4. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
      a. With faced batt/blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

C. Set vapor retard faced units with facing toward the warm side of construction except as otherwise indicated. Do not obstruct ventilation spaces, except for fire blocking.
   1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure air-tight installation.

D. Apply Celbar spray-on acoustical insulation in accordance with manufacturer's recommendations to the inner face of drywall, plywood sheathing or other wall finish to proper thickness within wall cavity between studs, sealing tightly around structural, plumbing and electrical piping/devices within wall. Allow proper drying time before installing second face of drywall.

3.04 INSTALLATION OF VAPOR RETARDERS

A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.

1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.05 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07 25 00

CONCRETE SLAB VAPOR EMISSIONS TREATMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Spray applied concrete sealer system.

B. Install Vapor Emission Treatment Systems where tests reveal presence of more than acceptable moisture and alkali levels in accordance with Test method ASTM F 1869 or ASTM F 2170.

C. Related Sections
1. Section 03 30 00, Cast-in Place Concrete.
2. Section 03 39 00, Concrete Curing.
3. Division 09 sections for floor finishes that require maximum moisture and alkali levels.

1.02 PERFORMANCE REQUIREMENTS

A. Vapor emissions floor treatment shall reduce vapor emissions from on-grade slabs to levels satisfactory to resilient flooring manufactures requirements and warranties.

B. Vapor emission floor treatment shall prevent negative side moisture migration through concrete floor and shall allow for all types of flooring surface treatment systems.

C. Vapor emission floor treatment shall be alkali-neutralizing and shall penetrate into concrete materials and chemically form protective crystalline barrier between surface. Inner barrier so formed shall not be affected by Ultra-violet light, abrasion and chemicals and shall permanently seal and waterproof concrete against harmful effects of water intrusion, freeze-thaw cycle damage, de-icing salts and chloride migration.

1.03 SUBMITTALS

A. Product data describing physical and performance characteristics.

B. Manufacturers written installation instructions.

C. Manufacturer's certificate indicating applicator is accepted installer.

D. Moisture vapor emission test results. Indicate environmental conditions, installation procedures used, deficiencies and corrective actions taken for filler, vapor emissions coating and membrane.

1.04 SYSTEM DESCRIPTION

A. Sealer/Hardener/Vapor Barrier compound, with minimum of 5 years documented experience to control moisture vapor emission, having 34 percent solid content, compatible with all flooring material, adhesives, bond breakers and Overlayments. Complying with STM C-309, ASTM C-1315. Surface treatment applied on new cured and existing slabs receiving new resilient flooring, sheet vinyl and vinyl composition tile, rubber tile, wood flooring, carpet, and resinous flooring.

1.05 QUALITY ASSURANCE

A. Applicator: Company approved and certified by vapor emission floor treatment manufacturer.

B. Requirements of Regulatory Agencies: Materials used in formulation of product shall conform to all local, State, and Federal air quality and environmental control standards.

C. Pre-installation Conference
1. Pre-installation meeting: Schedule before installing concrete floor slabs.
2. Required Attendees: Contractor's representative, Architect's representative. Owner's representative, Manufacturer's representative, Subcontractor, Installer.
3. Convene before installation of concrete.
4. Advise Contractor al all Warranty requirements.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver material in original sealed containers, clearly marked with manufacturer's name and brand name.

B. Store materials in accordance with manufacturer's recommendations.

1.07 WARRANTY

A. Submit under provisions of Division 01, General Requirements.

B. Provide 15-year Full System warranty issued to the Owner of the facility covering all labor and materials needed to replace all floor covering that fails due to concrete moisture vapor emission and moisture born contaminates such as alkalinity.
1. Issue a certificate of insurance in amount of $2,000,000.00

C. Include all costs for replacement of failed flooring material installed over moisture seal membrane, cracks, joints and holes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Creteseal, Anaheim, CA Product: CS 2000

   2. Or equal as approved prior to bid opening in accordance with Division 1, Section Substitution Procedures for substitution requests submitted at least 14 days prior to date for bid opening.

2.02 MATERIALS

A. Vapor Emission floor Treatment: Silicate-based or epoxy-based solution to penetrate on-grade concrete floor surfaces to form protective crystalline moisture barrier.

B. Accessory Materials: As recommended by manufacturer/or intended application.

C. Verify floor treatment product is compatible with flooring material and adhesive. Provide letter or other documentation from flooring manufacturer that floor treatment product is acceptable for use with their flooring.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Manufacturer's representative shall be on site to document and oversee the entire installation process.

B. Verify surfaces are dry and free of dirt and contaminates.

C. Verify moisture and alkalinity tests have been conducted per ASTM F 1869 or ASTM F 2170.

D. Verify existing concrete conditions are suitable to receive the Work of this Section.

E. Repair concrete where required according to manufacturer's recommendations.

F. Do not begin application until unsuitable conditions have been corrected, and control joints have been sawcut. Sawcut of control joints after installation of

treatment will not be accepted. Tool joints where indicated prior to installation of treatment.

G. Beginning of Installation means acceptance of existing substrate and site conditions.

3.02 PREPARTION

A. Prepare surface by removal of laitance, grease, adhesives, unapproved patching compounds and foreign matter from existing concrete. Use mechanical means (scarifing or bead blasting) where required for existing slabs.

B. Thoroughly clean all cracks. Apply to structurally sound concrete surfaces, free of voids and cracks. If needed apply cementitious patch or approved epoxy filler to any voids or cracks. Groove out all cracks/control joints and fill with an approved patching compound.

C. Clean expansion joints and control joints as required.

D. Maintain building temperature above 65 degrees Fahrenheit for a period of 48 hours prior to start of installation to start of installation of base coat.

3.03 APPLICAITON

A. Apply the products according to the manufacturer's instructions.

B. Manufacturer technician will be on site the day of the concrete pour at the beginning of the Work to install or train in application, document and return on every application thereafter to verify that proper procedures are followed.

C. Apply concrete Surface Treatment CS2000 / Sealer / Hardener/ Curing Compound after calcium chloride test and subsequent results have been performed as soon as harsh weather permits, prior to any other chemical treatments for concrete slabs either on grade, below grade or above grade receiving resilient flooring such as sheet vinyl, vinyl composition tile, rubber, wood flooring, carpet, epoxy coatings and overlays.

D. Apply CS2000 to the concrete slabs as soon as final finishing operations are complete, control joints are tooled and concrete has hardened sufficiently to sustain foot traffic without damage.

E. Spray Apply CS2000 at the rate of 200 square feet per gallon. If puddling or bird bathing occurs, lightly broom product evenly over the substrate until product has completely penetrated the surface.

F. If within 2 hours after initial application areas are subjected to heavy rainfall and puddling occurs, reapply CS2000 product to these areas as soon as weather condition permits.

3.04 TESTING

A. Moisture test per ASTM F 1869 or ASTM F 2170 after installation of system.
   1. ASTM F1869: 3 – 5 lbs.
   2. ASTM F2170: 75%
   3. ASTM F710: Alkalinity test: less than 90pH.

3.05 PROTECTION

A. Prohibit traffic on finish floor surface prior to installation of finish floor covering.

END OF SECTION

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SECTION 07 41 13

METAL ROOF PANELS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Mechanically-seamed, standing seam metal roof panels, with related metal trim and accessories.

B. Provide Self-Adhering Sheet Waterproofing Underlayment in accordance with Section 07 13 13.

1.02 RELATED REQUIREMENTS

A. Division 07 Section "Sheet Metal Flashing and Trim" for formed sheet metal copings, flashings, reglets, and roof drainage items in addition to items specified in this Section.

B. Division 07 Section "Joint Sealants" for field-applied Joint Sealants.

1.03 REFERENCES

A. American Architectural Manufacturer's Association (AAMA): www.aamanet.org:

1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
2. AAMA 809.2 - Voluntary Specification Non-Drying Sealants.

B. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

C. ASTM International (ASTM): www.astm.org:

1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
3. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
4. ASTM A 980 - Standard Specification for Steel, Sheet, Carbon, Ultra High Strength Cold Rolled.
5. ASTM C 645 - Specification for Nonstructural Steel Framing Members.

6. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
7. ASTM D 1003 - Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.
8. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
9. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
10. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
11. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
12. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
13. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

D. Cool Roof Rating Council (CRRC): www.coolroofs.org/productratingprogram.html:

1. CRRC-1-2008 - CRRC Product Rating Program.

E. International Accreditation Service (IAS):

1. IAS AC 472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, Part B.

F. Underwriters Laboratories, Inc. (UL): www.ul.com:

1. UL 580 - Tests for Uplift Resistance of Roof Assemblies

G. US Environmental Protection Agency: www.energystar.gov/index.cfm:

1. Energy Star Reflective Roof Products.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's technical representative, inspection agency and related trade contractors.

1. Coordinate building framing in relation to metal panel system.
2. Coordinate openings and penetrations of metal panel system.
3. Coordinate work of Division 07 Sections "Self-Adhering Sheet Waterproofing" and "Sheet Metal Flashing and Trim" and openings and penetrations and manufacturer's accessories with installation of metal panels.

1.05 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming, and accredited under IAS AC 472 Part B.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years experience in manufacture of similar products in successful use in similar applications.

1. Approval of Comparable Products: Submit the following at least 14 days prior to bid in accordance with Division 1 Section "Substitution Procedure", within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.
b. Samples of each component.
c. Sample submittal from similar project.
d. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
e. Sample warranty.
f. IAS AC 472 certificate.

2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
3. Approved manufacturers must meet separate requirements of Submittals Article.

C. Installer Qualifications: Experienced Installer certified by metal panel manufacturer with minimum of five years experience with successfully completed projects of a similar nature and scope.

1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway.

1.06 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets for specified products.

B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, roof accessories, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work.

1. Indicate points of supporting structure that must coordinate with metal panel system installation.

2. Include data indicating compliance with performance requirements.
3. Include structural data indicating compliance with requirements of authorities having jurisdiction.

C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.

1.07 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Indicating compliance of products with requirements, witnessed by a professional engineer.

B. Qualification Information: For Installer firm and Installer's field supervisor.

C. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC 472.

D. Manufacturer's Warranty: Sample copy of manufacturer's standard warranty.

1.08 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.

1. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.

1.10 COORDINATION

A. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.

1.11 WARRANTY

A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within two years from date of Substantial Completion.

B. Special Weathertightness Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail to remain weathertight, including leaks, without monetary limitation within 15 years from date of Substantial Completion.

C. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within 25 years from date of Substantial Completion, including all labor and material costs.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Basis of Design Manufacturer: **MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.**; Houston TX. Tel: (877)713-6224; Email: info@mbci.com; Web: www.mbci.com.

1. Provide basis of design product, or comparable product approved by Architect prior to bid.

2.02 PERFORMANCE REQUIREMENTS

A. General: Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.

B. Radiative Property Performance:

1. Solar Reflectance Index: Minimum 78 for roof slopes of 2:12 or less and 29 for roof slopes greater than 2:12 under medium wind conditions, per ASTM E 1980.
2. Energy Star Qualified: Listed on USDoE ENERGY STAR Roof Products Qualified Product List.
3. Energy Performance: Listed in CRRC Rated Product Directory, with minimum properties as required by applicable Energy efficiency or High-Performance Green Building standard.

C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:

1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.

    a. Wind Uplift Testing: Certify capacity of metal panels by actual testing of proposed assembly per ASTM E 1592.
2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/180 of the span with no evidence of failure.
3. Seismic Performance: Comply with ASCE 7, Section 9, "Earthquake Loads."

D. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class UL-90.

E. Air Infiltration, ASTM E 1680: Maximum 0.25 cfm/sq. ft. (1.27 L/s per sq. m) at static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).

F. Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 12 lbf/sq. ft. (575 Pa).

G. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

2.03 METAL ROOF PANELS

A. Mechanically-seamed, Concealed Fastener, Metal Roof Panels: Structural metal roof panel consisting of formed metal sheet with vertical ribs at panel edges, installed by lapping and mechanically interlocking edges of adjacent panels, and attaching panels to supports using concealed clips and fasteners in a weathertight installation.

1. Basis of Design: **MBCI, BattenLok HS**, www.mbci.com/battenlokHS.html.
2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ55 (Grade 340, Coating Class AZM165) unpainted Galvalume Plus coating.

    a. Nominal Coated Thickness: 22 gage.

    b. Panel Surface: Smooth with striations in pan.
    c. Exterior Finish: Exposed Galvalume Plus coating.
    d. Color: As indicated.

3. Panel Width: 16 inches (406 mm).
4. Panel Seam Height: 2 inch (50.8 mm).
5. Joint Type: Mechanically seamed.

2.04 METAL ROOF PANEL ACCESSORIES

A. General: Provide complete metal roof panel assembly incorporating trim, copings, fascias, gutters and downspouts, and miscellaneous flashings, in profiles as indicated. Provide required fasteners, closure strips, thermal spacers, splice plates, support plates, and sealants as indicated in manufacturer's written instructions.

B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.

C. Panel Clips: Provide panel clip of type specified, at spacing indicated on approved shop drawings.

1. Two-piece Floating: ASTM C 645, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.

D. Panel Fasteners: Self-tapping screws and other acceptable corrosion-resistant fasteners recommended by roof panel manufacturer. Where exposed fasteners cannot be avoided, supply fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.

E. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:

1. Factory-Applied Seam Sealant: Manufacturer's standard hot-melt type.
2. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.

F. Steel Sheet Miscellaneous Framing Components: ASTM C 645, with ASTM A 653/A 653M, G60 (Z180) hot-dip galvanized zinc coating.

G. Roof Accessories: Approved by metal roof panel manufacturer for plumbing vents, exhaust platforms/curbs and similar items penetrating or installed on roof.

2.05 FABRICATION

A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Fabricate metal panel joints configured to accept factory-applied sealant providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.

C. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved shop drawings.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

2.06 FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions for unpainted Galvalume Plus coating meeting solar reflectance index requirements.

B. Interior (underside) Finish: 0.5 mil (0.013 mm) total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.

1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:

a. 1/4 inch (6 mm) in 20 foot (6.1 m) in any direction.
b. 3/8 inch (9 mm) over any single roof plane.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal roof panel system installation.

3.02 PREPARATION

A. Miscellaneous Supports: Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C 754 and manufacturer's written instructions.

B. Install Self-Adhering Sheet Waterproofing underlayment over the entire roof deck and up 6" minimum onto abutting walls, platforms, vent pipes and other

similar elements for a watertight roof deck in accordance with Section 07 13 13 and manufacturer's recommendations. Add additional strips of self-adhering membrane at metal flashing edges to shed water.

C. Flashings: Provide flashings as required to complete metal roof panel system. Install in accordance with Section 07 62 00 "Sheet Metal Flashing and Trim" and as indicated on draw3ings as required for watertight installation.

3.03 METAL PANEL INSTALLATION

A. Mechanically-Seamed, Standing Seam Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Attach panels to supports using clips, screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.

1. Fasten metal panels to supports with concealed clips located 12" maximum from ends and 24" maximum on center at each standing seam as indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
2. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
3. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

3.04 ACCESSORY INSTALLATION

A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
3. Provide concealed fasteners except where noted on approved shop drawings.

4. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.

1. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."

3.05 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency acceptable to Architect to perform field tests and inspections and to prepare test reports.

3.06 CLEANING AND PROTECTION

A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following sheet metal flashing and trim:
   1. Formed roof drainage system.
   2. Formed low-slope roof flashing and trim where not part of Section 07 41 13.
   3. Formed wall flashing and trim (typical at perimeter of all wall openings).
   4. Self-adhering flexible membrane used in conjunction with sheet metal flashing where not part of Section 07 13 13 or 07 41 31.

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrication" for stainless steel components.
   2. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
   3. Division 7 Section "Metal Roof Panels" for metal roofing and flashing, trim and accessories, and Self-Adhering Sheet Waterproofing" for flexible flashing at wall openings.
   4. Division 9 Section "Portland Cement Plastering" for installing flashing and trim integral with plaster finish at wall openings.
   5. Division 22 Section "Plumbing" for roof drains & pipe fittings that attach to sheet metal gutters.

1.02 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.03 SUBMITTALS

A. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
   1. Identify material, thickness, weight, and finish for each item and location in Project.
   2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
   3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.

1.04 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Standard commercial items may be used for flashing, trim, reglets, and similar purposes provided such items meet or exceed the quality standards specified.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.06 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.01 SHEET METALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality, mill phosphatized for field painting.

B. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.

2.02 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads, suitable for galvanized steel, galvanized or cadmium plated.
   1. Nails for Stainless Steel Sheet: Series 300 stainless steel, 0.109 inch minimum and not less than 7/8 inch long, barbed with large head.
   2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
   3. Blind Fasteners: Rivets High-strength aluminum, stainless-steel or as recommended for the particular use.
   4. Washers: As required, neoprene faced where water-tight condition is required.
   5. Bolts and Nuts: FF-B-578 C, FF-B-588C.

C. Solder for Lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Solder for Zinc: ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.

E. Burning Rod for Lead: Same composition as lead sheet.

F. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape, suitable for high temperature conditions.

G. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

J. Self-Adhering, Polyethylene-Faced Sheet: ASTM D 1970, 40 mils thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
   1. Available Products:
      a. Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.; "CCW WIP 300HT."
      b. Grace, W. R. & Co.; "Ultra."
      c. Owens Corning; "WeatherLock."
      d. Protecto Wrap Company; "Rainproof 40."

K. Slip Sheet: Building paper, minimum 5 lb/100 sq. ft., rosin sized.

L. Underlayment Felt: Asphalt saturated organic felt per CBC Standard 32-1, 15 lb. minimum.

2.03 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
   1. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
   1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.04 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate from materials as indicated by the drawings (match siding when exposed) to cross section indicated, complete with end pieces, outlet tubes, and other special pieces and accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness at a minimum of 36"o.c. or as indicated by the drawings and/or SMACNA. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
   1. Gutter Style: As indicated by drawings.
   2. Expansion Joints: Butt type.
   3. Accessories: Stainless steel wire ball downspout strainer.

B. Downspouts: Fabricate downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
   1. Manufactured Hanger Style: 1-35A for rectangular downspouts and I-35J for round downspouts.
   2. Provide sheet metal terminal head in shapes indicated or as approved by Architect.
   3. Coordinate with plumbing contractor for water-tight installation of horizontal and vertical roof drains in sheet gutters as indicated in drawings.

2.05 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Base Flashing: Fabricate from the following material:
   1. Galvanized Steel: 0.0276 inch, 22 gage, thick, unless indicated otherwise by drawings.

B. Counterflashing: Fabricate from the following material:
   1. Galvanized Steel: 0.0217 inch, 24 gage, thick, unless indicated otherwise by drawings.

C. Flashing Receivers: Fabricate from the following material:
   1. Galvanized Steel: 0.0217 inch, 24 gage, thick, unless indicated otherwise by drawings.

D. Roof-Penetration Flashing: Fabricate from the following material:
   1. Lead: 4.0 lb/sq. ft., hard tempered.

E. Openings Flashing in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high end dams. Fabricate from the following material:
   1. Galvanized Steel: 0.0217 inch, 24 gage, thick.

F. Roof Edge Flashing (Gravel Stop) and Fascia Caps: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Furnish with 6-inch-wide joint cover plates.
   1. Joint Style: Butt, with 12-inch- wide concealed backup plate.
      a. Stainless Steel: .031 inch, 22 gage, thick, unless indicated otherwise by drawings.
      b. Galvanized Steel: 0.0396 inch, 24 gage thick, unless indicated otherwise by drawings.

G. Copings/Parapet Caps: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, seal, and solder or weld watertight.
   1. Joint Style: Butt, with 12-inch-wide concealed backup plate.
   2. Fabricate copings from the following material:
      a. Stainless Steel: .031 inch, 22 gage, thick, unless indicated otherwise by drawings.
      b. Galvanized Steel: 0.0396 inch, 24 gage thick, unless indicated otherwise by drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
   1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   2. Verify compliance with requirements for installation tolerances of substrates.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

C. Self-Adhering membrane underlayment: Install similar to underlayment at parapet caps and all wall and roof openings including door, window, lower opening perimeters and other wall/roof penetrations to seal substrate from moisture and shed water.

3.03 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
   2. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".
   3. Torch cutting of sheet metal flashing and trim is not permitted.

B. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
   1. Make lock seam work flat and true to line, sweating full of solder.
   2. Make lock seams and lap seams, when soldered, at least 1/2" wide.
   3. Where lap seams are not soldered, lap according to pitch, but in no case less than 3".
   4. Make flat and lap seams in the direction of flow.

C. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

D. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

E. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

F. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

G. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
1. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.
2. Provide suitable watertight expansion joints for runs of more than 40'-0", except where closer spacing is indicated on the Drawings or required for proper installation.

H. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
1. Whenever possible, secure metal by means of clips or cleats, without nailing through the exterior metal.
2. In general, space nails, rivets, and screws not more than 8" apart and, where exposed to the weather, use lead washers.
3. For nailing into wood, use barbed roofing nails 1-1/4" long by 11 gage.
4. For nailing into concrete, use drilled plugholes and plugs.
5. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners unless noted otherwise.
6. Stainless Steel: Use stainless-steel fasteners.

I. Seal joints with elastomeric sealant as required for watertight construction. Install sealant tape where indicated.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

J. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.
1. Perform soldering slowly, with a well heated copper, in order to heat the seams thoroughly and to completely fill them with solder.
   a. Do not use open-flame torches for soldering.

b. Heat surfaces to receive solder and flow solder into joints.
c. Fill joints completely.
d. Completely remove flux and spatter from exposed surfaces.

2. Perform soldering with a heavy soldering copper of blunt design, properly tinned for use.
   a. Pre-tinning is not required for lead.
3. Make exposed soldering on finished surfaces neat, full flowing, and smooth.
4. After soldering, thoroughly wash acid flux with a soda solution.

3.04 ROOF FLASHING INSTALLATION (Where not included as part of Metal Panel Roofing System)

A. General: Install sheet metal roof flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
   1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch centers.

C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
   1. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.
   2.

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
   1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
   2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.05 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Openings Flashing in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.06 MISCELLANEOUS PRODUCTS (if not detailed on the drawings)

A. Sheet metal copings:
1. Follow standards shown in SMACNA manual, CHAPTER 3
2. Use 22 gage MIN. galvanized sheet metal, unless otherwise noted on the drawings.
3. Slope surface toward roof side of wall with a minimum of 1/2":12" slope.
4. Angle and return bottom edges for rigidity.
5. Turn down a minimum of 4" at inside edges, or as otherwise detailed.
6. Turn down outside a minimum of 4", or as otherwise indicated.

B. Exposed platforms (if not detailed on the Drawings):
1. Provide a single piece of 20 gage galvanized sheet metal cover over roofing felts as detailed or specified in the roofing sections.
   a. Cover shall turn down no less than 4" and have corners soldered;
   b. Where seams are required, use single lock standing seam (SMACNA Figure 3-3) or flat lock seam (SMACNA Figure 3-2).
   c. Attach cover to platform using wood screws with neoprene washers every 12" on centers on the vertical surface where required.
   d. Do not penetrate membrane below horizontal metal cover.

C. Pitch pans (if applicable):
1. Where unflashed projections extend through or rest upon the roof surface, and cannot be flashed with a prefabricated lead boot or SBS-modified bitumen, provide a primed pitch pan in accordance with SMACNA Manual, Plate 68, Figure E, with minimum 4" high collar and 6" flange, except where otherwise indicated.
2. Pitch pan shall be spot welded and hot soldered to prevent bitumen loss.
3. Set flange on last layer of SBS modified bitumen roofing membrane, and nail at 6" on centers.
4. Cover flange with one layer of SBS-modified bitumen, extending onto roof 4", 8", and 12".
5. Fill inside of pan with minimum 1-1/2" of modified elastomeric asphalt mastic over grout.

D. Cold pipe flashing:
1. Provide 4 lb lead manufactured flashings in accordance with SMACNA , Figure 4-14b.

2. Integrate flanges within roofing plies.

E. Provide custom hooded flashings at all ganged vertical pipes/penetrations, using curbed type flashings in accordance with SMACNA Manual, Figure 4-14A.

F. Surface mounted counterflashings:
1. At concrete or masonry walls, provide a two-piece surface-mounted counterflashing system of galvanized steel (Fry or approved equal).
2. Seal receiver to wall surface with a thermoplastic rubber sealant approved in advance by the Architect.
3. Fasten the receiver into the wall at 12" on centers; snap in the second piece after base flashing has been installed.
4. At concrete masonry units, provide a thermoplastic rubber sealant approved in advance by the Architect.

G. Scuppers at exterior walls (if not detailed on the drawings) SMACNA Figure 1-26:
1. Minimum exterior dimensions shall be 4" x 8".
2. Do not damage structural elements.
3. Provide new galvanized sheet metal scuppers with a minimum 6" wide flange.
4. Weld and hotsolder in accordance with SMACNA chapter 1
5. Prime and cover both sides of flange with bitumen.
6. Integrate into roofing felts.
7. Extend outlet a minimum of 2" beyond wall and form a drop at bottom edge.
8. Caulk around at exterior of wall.
9. Seal roofing into scuppers outlet bitumen.
10. Provide leader boxes and downspouts where indicated.
11. Unless otherwise indicated, overflow scupper openings shall be 2" above main scupper opening through wall.

H. Drains: SMACNA Figure 1-37
1. Provide 4 lb lead drain pan in drains and overflows.
2. Do not cut lead to fit corners.
3. Install roof around the sump area as specified and cut roofing ply assembly flush with drain assembly at drain opening.
4. Provide asphalt primed lead flashing on top of roofing felts; size the lead flashing to extend uninterrupted up cants or tapered edge strips, and to terminate just below deck line.
5. Immediately install and tighten clamping ring into lead only, using caution not to break lead sheet.
6. Hand nail perimeter 4" on centers with one row of 1" head ringshanked nails.
7. Cover with roofing cap sheet.
8. All edges shall exhibit minimum 1/4" bead of asphalt.

3.07 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.08 ROOF FLASHING INSTALLATIONS

A. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
   1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 24-inch centers.
   2. interlock interior leg of coping with continuous cleats anchored at 24-inch centers.

3.09 MISCELLANEOUS FLASHING INSTALLATION

A. Overhead-Piping Safety Pans: Suspend pans from pipe and install drain line to plumbing waste or drain line.

3.10 TESTS

A. Upon request of the Architect, demonstrate by hose or standing water that the flashing and sheet metal are completely watertight.

3.11 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 84 10

THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.

B. Refer to Section 07 84 43 for Joint Firestopping systems, sealants and requirements.

1.02 PERFORMANCE REQUIREMENTS

A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
   1. Fire-resistance-rated walls including fire walls fire barriers and smoke barriers.
   2. Fire resistance-rated horizontal assemblies including floors, floor/ceiling assemblies and ceiling membrane of roof/ceiling assemblies.

B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814:
   1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
   2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas.
      a. Penetrations located outside wall cavities.
      b. Penetrations located outside fire-resistance-rated shaft enclosures.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
   1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: for each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
1. Types of penetrating items.
2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.

D. Qualification Data: For Installer.

E. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."; or UL Qualified Firestop Contractor; or a Hilti Accredited Firestop Specialty Contractor (HAFSC).

B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
   1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
   2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
      a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
      b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
         1) UL in its "Fire Resistance Directory."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.07 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 that are produced by one of the following manufacturers:

1. Hilti, Inc.
2. Johns Manville.
3. RectorSeal Corporation (The).
4. Specified Technologies Inc.
5. 3M; Fire Protection Products Division.
6. Tremco; Sealant/Weatherproofing Division.
7. USG Corporation.

2.02 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
    a. Slag-/rock-wool-fiber insulation.
    b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    c. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.03 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

C. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

2.04 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.03 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or

deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.05 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

CONCRETE FLOORS			**CONCRETE OR BLOCK WALLS**		
TYPE OF PENETRANT	**F-RATING (HR)**	**UL-CLASSIFIED SYSTEM**	**TYPE OF PENETRANT**	**F-RATING**	**UL-CLASSIFIED SYSTEM**
CIRCULAR BLANK OPENINGS	1	FA 0006,CAJ 0055,CAJ 0070	CIRCULAR BLANK OPENINGS	1	CAJ 0055, CAJ 0070
	2	FA 0006,CAJ 0055,CAJ 0070		2	CAJ 0055, CAJ 0070
	3	FA 0006, CAJ 0055		3	CAJ 0055
SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, FA 1017	SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, WJ 1021
	2	CAJ 1226, FA 1017		2	CAJ 1226, WJ 1021
	3	CAJ 1226, FA 1017		3	CAJ 1226, WJ 1041, WJ 1042
	4	CBJ 1037, CBJ 1034		4	CBJ 1034, CBJ 1037, WJ 1041, WJ 1042
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	FA 2053, FA 2025, CAJ 2109, CAJ 2098, CAJ 2141, CAJ 2167, CBJ 2021	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	CAJ 2109, CAJ 2098, CAJ 2167
	2	FA 2053, FA 2025, CAJ 2109, CAJ 2098, CAJ 2141, CAJ 2167, CBJ-2021		2	CAJ 2109, CAJ 2098, CAJ 2167
	3	FA 2054, CAJ 2109, CAJ 2098		3	CAJ 2109, CAJ 2098
				4	WJ 2057
SINGLE OR BUNDLED CABLES	1	FA 3007,CAJ 3095,CAJ 3096	SINGLE OR BUNDLED CABLES	1	WJ 3036, CAJ 3095, CAJ 3096
	2	FA 3007,CAJ 3095,CAJ 3096		2	WJ 3036, CAJ 3095, CAJ 3096
	3	FA 3007,CAJ 3095,CAJ 3096		3	CAJ 3095, CAJ 3096
				4	WJ 3050
CABLE TRAY	1	CAJ 4034, CAJ 4035	CABLE TRAY	1	WJ 4016, CAJ 4034, CAJ 4035
	2	CAJ 4034, CAJ 4035		2	WJ 4016, CAJ 4034, CAJ 4035
	3	CAJ 4034, CAJ 4035		3	CAJ 4034, CAJ 4035
				4	WJ 8007

SINGLE INSULATED PIPES	1	FA 5015, FA 5016, CAJ 5090, CAJ 5091, CAJ 5098	SINGLE INSULATED PIPES	1	CAJ 5090, CAJ 5091, CAJ 5061
	2	FA 5015, FA 5016, CAJ 5090, CAJ 5091, CAJ 5098		2	CAJ 5090, CAJ 5091, CAJ 5061
	3	FA 5016, CAJ 5090		3	CAJ 5090, CAJ 5061
	4	CBJ 5006		4	CBJ 5006, WJ 5028
ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017	ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017
	2	CAJ 6006, CAJ 6017		2	CAJ 6006, CAJ 6017
	3	CAJ 6006, CAJ 6017		3	CAJ 6006, CAJ 6017
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046, CAJ 7051	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046, CAJ 7051, WJ 7021, WJ 7022
	2	CAJ 7046, CAJ 7051		2	CAJ 7046, CAJ 7051, WJ 7021, WJ 7022
	3	CAJ 7046, CAJ 7051		3	CAJ 7046, CAJ 7051
MIXED PENETRANTS	1	CAJ 8041, CAJ 8056	MIXED PENETRANTS	1	CAJ 8041, CAJ 8056, WJ 8007
	2	CAJ 8041, CAJ 8056		2	CAJ 8041, CAJ 8056, WJ 8007
	3	CAJ 8041, CAJ 8056		3	CAJ 8041, CAJ 8056, WJ 8007

END OF SECTION

SECTION 07 84 43

JOINT FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General, Special and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested and listed firestop systems shall be used in specific locations as follows:

A. Safing slot gaps between edge of floor slabs and perimeter curtain walls.

B. Openings between structurally separate sections of wall or floors.

C. Gaps between the top of walls and ceilings or roof assemblies.

D. Expansion joints in walls and floors.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03 30 00 - Cast-In-Place Concrete
2. Section 04 22 00 - Unit Masonry
3. Section 07 84 10 - Through Penetration Firestop Systems
4. Section 07 92 00 - Joint Sealants
5. Division 8 Sections - Glazed Assemblies
6. Division 9 Sections - Plaster and Gypsum Board

1.05 REFERENCES

A. Underwriters Laboratories, Inc. (UL) Fire Resistance Directory, Volume II, updated annually:

1. Joint Systems (XHBN)
2. Perimeter Fire Containment Systems (XHDG)
3. Fire Resistance Ratings (BXRH)
4. Fill, Voids, or Cavity Material (XHHW)
5. Forming Materials (XHKU)

B. Omega Point Laboratories, Inc. (OPL) Listed Products Directory, Volume II, updated annually:

1. Fire Resistant Joint Systems

C. ASTM E 1966, "Standard Test Method for Fire-Resistive Joint Systems"

D. ASTM E 1399, "Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Width of Architectural Joint Systems"

E. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials"

F. ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops"

G. ASTM E 2307, "Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus"

H. ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems"

I. International Firestop Council Recommended (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments

J. California Building Code (IBC 2013)

K. NFPA 101 - Life Safety Code

1.06 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation shall meet requirements of ASTM E 1966 and/or ANSI/UL 2079 tested and listed assemblies that provide fire-resistance ratings not less than that of the construction in which the joint occurs.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no tested and listed system is available through a manufacturer, an engineering judgment derived from similar tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents shall follow requirements set forth by the International Firestop Council.

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

B. Manufacturer's engineering judgment identification number and details when no tested and listed system is available for an application. Engineering judgment shall include both project name and contractor's name who will install firestop system as described in document.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. The work is to be installed by a contractor with at least one of the following qualifications:

FM 4991 Approved Contractor
UL Approved Contractor
Hilti (or other manufacturer approved by Architect) Accredited Fire Stop Specialty Contractor

C. Installer shall have not less than 3 years experience with fire stop installation.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL or OPL label, where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 JOINT FIRESTOPPING - GENERAL

A. Provide firestopping composed of components that are compatible with each other and substrates forming joints under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each fire-resistive joint system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Joints in or between Fire Rated Construction: Provide joint firestopping systems with ratings determined per UL 2079 or ASTM E 1966:

1. F-Rating: not less than the fire resistance rating of the construction they will join.

D. Joints at Exterior Curtain Wall / Floor Intersections: Provide joint firestopping systems with ratings determined per ASTM E 2307:

1. F-Rating: not less than the fire resistance rating of the construction they will join.

E. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079:

1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.

F. Joints at Intersection between Rated Wall Assemblies and Nonrated Horizontal Assemblies: Provide joint firestopping systems with ratings determined by ASTM E 2837.

G. Mold Resistance: Provide joint firestopping system sealant with mold and mildew resistance rating of 0 as determined by ASTM G21.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with joint systems (XHBN) listed in Volume II of the UL Fire Resistance Directory or OPL Listed Products Directory; provide products of the following manufacturer as identified below:

1. Hilti, Inc., Tulsa, Oklahoma
800-879-8000
www.us.hilti.com

2. Substitution requests submitted at least 14 days prior to bid date shall be considered in accordance with section 01 33 00 Submittal Procedures.

2.03 MATERIALS

A. Use only firestop products that have been tested in accordance with ASTM E 1966 and/or ANSI/UL 2079 for specific rated construction conditions conforming to construction assembly type, movement capability, spacing requirements, and fire-resistance-rating involved for each separate instance.

B. Sealants for use with fire-resistance-rated construction joints, the following products are acceptable:

1. Hilti Firestop Joint Spray (CFS-SP WB)
2. Hilti Elastomeric Firestop Sealant (CP 601S)
3. Hilti Flexible Firestop Sealant (CP 606)
4. Hilti Self-leveling Firestop Sealant (CP 604)

C. Sealants for use as part of a Perimeter Fire Barrier System between fire-resistance-rated floors and exterior wall assemblies, the following products are acceptable:

1. Hilti Firestop Joint Spray (CFS-SP WB)
2. Hilti Self-leveling Firestop Sealant (CP 604)

D. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal deck profile; use as a backer for spray material.

1. Hilti Speed Plugs (CP 777)
2. Hilti Speed Strips (CP 767)

E. The following products/systems may be used for smoke barriers and non-rated applications.

1. Hilti CP 506 Smoke and Acoustic Sealant
2. Hilti CP 572 Smoke and Acoustic Spray

F. At other conditions requiring firestopping and/or sealant, not described herein, provide a firestop system with an Assembly Rating as determined by ASTM E 1966 and/or ANSI/UL 2079 which is equal to the fire-resistance ratings of the construction in which the joint occurs.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
2. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
3. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
4. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Listed Products Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of construction joint materials.

1. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed joints to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities and/or independent inspection agency.

C. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

4.0 SYSTEM SCHEDULES:

JOINTS

Joint	Assembly Rating	System No
Gypsum wall to concrete floor (bottom of wall)	1 or 2 Hr	BWS0001c
Gypsum wall to concrete floor (bottom of wall)	1 or 2 Hr	BWS0002c
Gypsum shaft wall to concrete floor (bottom of wall)	1 or 2 Hr	BWS0023b
Gypsum wall to non-rated roof deck (top-of-wall continuity joint) (Max JW=1-1/2")	2 Hr	CJD-0004a
Gypsum wall to non-rated insulated roof deck (top-of-wall continuity joint) (Max JW=2")	1 Hr	CJD-0008
Gypsum wall to non-rated insulated roof deck (top-of-wall continuity joint) (Max JW=2")	1 Hr	CJD-0009
Gypsum wall to non-rated insulated roof deck (top-of-wall continuity joint) (Max JW=2")	1 Hr	CJD-0010
Concrete floor to floor joint (no mineral wool) (Max JW=1/2")	2 Hr	FFD-0052a
Concrete floor to floor joint (Max JW=2")	3 Hr	FFD-0055a
Concrete floor to floor joint (Max JW=3-1/2")	2 Hr	FFD-1011e
Concrete floor to floor joint (Max JW=3-3/4")	2 Hr	FFD-1012g
Concrete floor to floor joint (Max JW=3-1/2")	2 Hr	FFD-1013f
Concrete floor to floor joint (Max JW=3")	3 Hr	FFD-1026c
Concrete floor to floor joint (Max JW=6")	2 Hr	FFD-1039b
Concrete floor to floor joint (Max JW=2")	4 Hr	FFD-1047a
Concrete floor to floor joint (Max JW=3")	2 Hr	FFD-1087a
Concrete floor to wall joint (Max JW=1/2")	2 Hr	FWD-0041b
Concrete floor to wall joint (Max JW=2")	3 Hr	FWD-0042a
Concrete floor to wall joint (Max JW=3-1/2")	3 Hr	FWD-1011f

Concrete floor to wall joint (Max JW=3-3/4")	2 Hr	FWD-1012g
Concrete floor to wall joint (Max JW=3-1/2")	2 Hr	FWD-1013g
Concrete floor to wall joint (Max JW=3")	3 Hr	FWD-1021c
Concrete floor to wall joint (Max JW=6")	2 Hr	FWD-1037a
Concrete wall to concrete stair case (JW=1/4" to 3-3/4")	2 Hr	FWD-1043b
Concrete wall to concrete stair case (JW=1/4" to 3-3/4")	2 Hr	FWD-1046a
Concrete floor to wall joint (Max. JW=2")	4 Hr	FWD-1047b
Concrete floor to wall joint (Max JW=3")	2 Hr	FWD-1071a
Gypsum wall to concrete over fluted metal deck w/ optional use of spray-on fireproofing (top-of-wall)	1 or 2 Hr	HWD-0042t
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWD-0045k
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWD-0046h
Gypsum wall to concrete over metal deck w/ optional use of spray-on fireproofing (top-of-wall)	1 or 2 Hr	HWD-0049t
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWD-0076g
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWD-0077m
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWD-0080e
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWD-0081g
Gypsum wall to concrete floor (top-of-wall)	1 or 2 Hr	HWD-0082c
Gypsum wall to concrete floor or hollowcore (top-of-wall)	1 or 2 Hr	HWD-0083k
Gypsum wall to concrete over metal deck (top-of-wall)	1 or 2 Hr	HWD-0084h
Gypsum wall to concrete over metal deck (top-of-wall)	1 or 2 Hr	HWD-0085n
Gypsum wall to concrete over metal deck w/ optional use of spray-on fireproofing (top-of-wall)	1 or 2 Hr	HWD-0087r
Gypsum wall to concrete over metal deck w/ optional use of spray-on fireproofing (top-of-wall)	1 or 2Hr	HWD-0089r
Concrete or block wall to concrete floor joint (top-of-wall) (Max JW=3-1/2")	2 Hr	HWD-0097g
Concrete or block wall to concrete over fluted metal deck	1 or 2 Hr	HWD-0098m

(top-of-wall) (penetrations in flutes) (Max JW= 1")		
Gypsum wall to concrete floor or hollow core (top-of-wall)	1 or 2 Hr	HWD-0106k
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWD-0154h
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWD-0155e
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWD-0181e
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWD-0184h
Gypsum wall to concrete over metal deck w/ spray-on fireproofing completely filling flutes (top-of-wall)	1 or 2Hr	HWD-0190e
Gypsum wall to concrete floor or hollow core (top-of-wall) (Max JW=1")	1 or 2 Hr	HWD-0209h
Gypsum wall to concrete over fluted metal deck with structural steel beams or bar joists penetrating wall (top-of- wall)	1 or 2 Hr	HWD-0218h
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWD-0225b
Concrete or block wall to concrete over fluted metal deck with structural steel beams or bar joists penetrating wall (top-of- wall) (Max JW=1")	2 Hr	HWD-0258f
Gypsum wall to bottom of fire-proofed steel I-beam to concrete over metal deck	1 or 2 Hr	HWD-0259m
Gypsum wall to concrete over fluted metal deck (top-of-wall) (offset flutes)	1 or 2 Hr	HWD-0264f
Concrete or block wall to concrete floor joint (top-of-wall) (Max JW=1") (no mineral wool) (backer rod optional)	3 Hr	HWD-0268d
Concrete or block wall to concrete over fluted metal deck (top-of-wall) (stuff/spray/stuff/spray) (Max JW=2")	2 Hr	HWD-0285e
Concrete or block wall to concrete over fluted metal deck (top-of-wall) (stuff/spray/stuff/spray) (Max JW=2")	2 Hr	HWD-0286e
Gypsum wall to concrete over fluted metal deck (top-of-wall) (perpendicular) (Max JW=1")	1,2,3 or 4 Hr	HWD-0292e
Concrete or block wall to concrete over fluted metal deck (top-of-wall) (perpendicular) (Max JW=1")	4 Hr	HWD-0294d

Gypsum wall to concrete over fluted metal deck (top-of-wall) (parallel) (Max JW=1")	1,2,3or 4 Hr	HWD-0295d
Concrete or block wall to concrete over fluted metal deck (top-of-wall) (parallel) (Max JW=1")	4 Hr	HWD-0296c
Gypsum wall to concrete over metal deck w/ spray-on fireproofing completely filling flutes and joint (top-of-wall)	2 Hr	HWD-0313e
Gypsum wall to concrete over fluted metal deck (top-of-wall) (perpendicular – cut to profile) (Max JW=3/4")	1 or 2 Hr	HWD-0324d
Gypsum shaft wall to concrete floor	2 Hr	HWD-0342g
Gypsum wall to concrete over metal deck (parallel or perpendicular) with one side inaccessible due to structural member	1 or 2 Hr	HWD-0388f
Concrete or block wall to concrete over metal deck (parallel or perpendicular) with one side inaccessible due to structural member	2 Hr	HWD-0389f
Gypsum Wall to concrete over metal deck (offset to flute) (Max JW=3/4")	1 or 2 Hr	HWD-0396e
Concrete or block wall to concrete floor joint (top-of-wall) (Max JW = 2")	3 Hr	HWD-0403a
Concrete or block wall to bottom of fire-proofed steel I-beam to concrete over metal deck	2 Hr	HWD-0440d
Gypsum wall to conrete over metal deck (top-of-wall) (perpendicular) (Max JW = ¾") (The Steel Network)	1 or 2 Hr	HWD-0460d
Gypsum wall to conrete floor joint (top-of-wall) (Max JW = ¾") (The Steel Network)	1 or 2 Hr	HWD-0466c
Concrete or block wall to concrete floor joint (top-of-wall) (Max JW=1")	2 Hr	HWD-0516a
Gypsum wall to insulated roof deck (top-of-wall)	1 Hr	HW-D-0528
Gypsum wall to insulated roof deck (top-of-wall)	1 Hr	HWD-0529
Gypsum wall to insulated roof deck (top-of-wall)	1 Hr	HW-D-0530
Gypsum wall to concrete over metal deck (top-of-wall) (perpendicular) (Max JW=1-3/4")	1 or 2 Hr	HWD-0538c
Gypsum wall to concrete floor (top-of-wall) (Max JW=1-3/4")	1 or 2 Hr	HWD-0539c
Gypsum wall to concrete over metal deck (top-of-wall) (perpendicular) (Max JW=1-3/4")	1 or 2 Hr	HWD-0540c

Gypsum shaft wall to concrete over metal deck (top-of-wall) (perpendicular) (Max JW=3/4")	2 Hr	HWD-0541d
Gypsum shaft wall to concrete over metal deck (top-of-wall) (parallel) (Max JW=3/4")	2 Hr	HWD-0542d
Gypsum wall to concrete over metal deck (top-of-wall) (perpendicular) (Max JW = ¾")	1 or 2 Hr	HWD-0545b
Gypsum wall to concrete over metal deck (top-of-wall) (perpendicular) (Penetrations through flutes) (Max JW=2")	1 Hr	HWD-0564c
Gypsum shaft wall to concrete over metal deck (top-of-wall) (perpendicular) (Max JW=1-1/2")	1 or 2 Hr	HWD-0569b
Gypsum shaft wall to concrete over metal deck (top-of-wall) (parallel) (Max JW=1-1/2")	1 or 2 Hr	HWD-0570b
Gypsum shaft wall to bottom of fireproofed steel beam to concrete over metal deck (top-of-wall) (parallel) (Max JW=1-1/2")	1 or 2 Hr	HWD-0571b
Gypsum shaft wall to flat concrete (top-of-wall) (Max JW=1-1/2")	1 or 2 Hr	HWD-0572b
Gypsum Wall to flat concrete or hollow core (top-of-wall) (includes max. 2" CPVC piping through joint) (Max JW=1")	1 or 2 Hr	HWD-0605a
Gypsum Wall to bottom of offset I beam with Z-bar extentions (Max JW=1-1/2")	1 or 2 Hr	HWD-0634a
Gypsum Wall to bottom of offset I beam with Z-bar extentions w/ additional gypsum (Max JW=1-1/2")	1 or 2 Hr	HWD-0635a
Gypsum Shaft Wall to bottom of offset I beam with Z-bar extentions (Max JW=1-1/2")	1 or 2 Hr	HWD-0636a
Gypsum wall to concrete over metal deck with one side inaccessible due to structural member (Max JW=1-1/2")	1 or 2 Hr	HWD-0639
Gypsum shaft wall to concrete over metal deck with one side inaccessible due to structural member (Max JW=1-1/2")	1 or 2 Hr	HWD-0640
Gypsum wall to flat concrete or hollow core (top-of-wall) (requires backer rod) (Max JW=1")	1 or 2 Hr	HWD-0654a
Gypsum wall parallel to fluted metal deck (cantilevered runner) (Max JW = 1")	1 or 2 Hr	HWD-0687a
Concrete or block wall to concrete floor joint (top-of-wall) (Max JW=3-1/2")	3 Hr	HWD-1008g
Concrete or block wall to concrete floor joint (top-of-wall)	2 Hr	HWD-1009f

(Max JW=3-3/4")		
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWD-1037d
Concrete wall to concrete over metal deck w/ spray-on fireproofing completely filling flutes (top-of-wall)	2 Hr	HWD-1041e
Concrete or block wall to concrete floor joint (top-of-wall) (Max JW=2")	4 Hr	HWD-1042a
Concrete or block wall to concrete over fluted metal deck w/ steel bracing (top-of-wall) (Max JW=3-1/2")	2 Hr	HWD-1044b
Concrete or block wall to concrete floor w/ steel bracing (top- of-wall) (Max JW=3-1/2")	2 Hr	HWD-1045c
Concrete or block wall to concrete floor (Max JW=3-1/4")	3 Hr	HWD-1058b
Gypsum wall perpendicular to fluted metal deck (Max JW = 2-1/2")	1 or 2 Hr	HWD-1066c
Gypsum wall parallel to fluted metal deck (Max JW = 2-1/2")	1 or 2 Hr	HWD-1067c
Gypsum wall to underside of flat concrete (Max JW = 2-1/2")	1 or 2 Hr	HWD-1068c
Block wall perpendicular/parallel to fluted metal deck (Max JW = 2-1/2")	1 or 2 Hr	HWD-1069b
Block wall to underside of flat concrete (Max JW = 2-1/2")	1 or 2 Hr	HWD-1070b
Block wall to underside of flat concrete (Max. JW= 3")	2 Hr	HWD-1078a
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWS-0036a
Gypsum wall to concrete over fluted metal deck (top-of-wall)	1 or 2 Hr	HWS-0037a
Concrete or block wall to concrete over fluted metal deck (top-of-wall)	2 Hr	HWS-0038a
Gypsum wall to concrete floor joint (top-of-wall)	1 or 2 Hr	HWS-0039a
Gypsum wall to concrete floor joint or fluted metal floor/roof deck (top-of-wall)	1 or 2 Hr	HWS-0053d
Gypsum wall to concrete floor or fluted metal floor/roof deck (top-of-wall)	1 or 2 Hr	HWS-0054c
Concrete or block wall to concrete floor hollow core concrete (top-of-wall) (Max Joint Height=0")	2 Hr	HWS-0055b
Gypsum Wall to bottom of offset I beam with Z-bar extentions (Max JW=1")	1 or 2Hr	HWS-0069b

Gypsum Wall to gypsum ceiling (Max JW = ½")	1 Hr	HW-S-0090a
Concrete wall to wall joint (Max JW=2")	2 Hr	WWD-0017c
Concrete wall to wall joint (Max JW=1") (backer rod optional)	3Hr	WWD-0032d
Gypsum wall to concrete/block wall joint (Max JW=3/4")	1 or 2 Hr	WWD-0040d
Concrete wall to wall joint (Max JW=2")	3 Hr	WWD-0064a
Gypsum wall to wall joint (Max JW = 2")	1 or 2 Hr	WWD-0067a
Gypsum wall to concrete wall joint (Max JW = 2")	1 or 2 Hr	WWD-0068a
Concrete wall to wall joint (Max JW=1")	2 Hr	WWD-0082a
Gypsum wall to concrete wall joint (requires backer rod) (Max JW=1")	1 or 2 Hr	WWD-0105a
Concrete wall to wall joint (Max JW=3-1/2")	3 Hr	WWD-1011e
Concrete wall to wall joint (Max JW=3-3/4")	2 Hr	WWD-1012f
Concrete wall to wall joint (Max JW=2")	4 Hr	WWD-1047a
Concrete wall to wall joint (Max JW=3")	2 Hr	WWD-1080a
Concrete wall to wall joint (Max JW=3-1/2")	2 Hr	WWD-1084a
Concrete wall to wall joint (Max JW=1")	2 Hr	WWS-0042b
Concrete wall to gypsum wall (gyp sitting on top of concrete) (Max JW=3/4")	1 or 2 Hr	WWS-0048c
Gypsum shaft wall to concrete wall (Max JW = 1")	1 or 2 Hr	WWS-0059a

PERIMETER JOINTS (Curtain Wall)

Curtain Wall	System No
Tilt-Up Concrete Panel Curtain Wall (Max JW=6")	CWD 1001
Tilt-Up Concrete Panel Curtain Wall (Max JW=6")	CWD 1003
Insulated Tilt-up Panel Curtain Wall (Max JW=8")	CWD 2025
Glass, Aluminum, or Granite Spandrel with Aluminum Framing (Max JW=8")	CWD 2026
Glass, Aluminum, or Granite Spandrel with Aluminum Framing (Max JW=8")	CWD 2027
Glass, Aluminum, or Granite Spandrel with Aluminum Framing (Max JW=4")	CWD 2046
Glass Spandrel Panel with Aluminum Framing (Max JW = 6")	CEJ 127P
Glass Spandrel Panel and Aluminum Framing (Max JW=6")	CEJ 216P
Concrete Panels with Steel Framing (Max JW=8")	CEJ 244P

Concrete Panels with Steel Framing (Max JW=8")	CEJ 245P
Glass Spandrel Panel and Aluminum Framing (Max JW=8")	CEJ 246P
Gypsum with EIFS Finish and Steel Framing (Max JW=8")	CEJ 259P
Gypsum with Stucco Finish and Steel Framing (Max JW=8")	CEJ 260P
Gypsum with Stone Finish and Steel Framing (Max JW=8")	CEJ 261P
Gypsum with Brick Finish and Steel Framing (Max JW=8")	CEJ 262P
Gypsum with Aluminum or Steel Siding and Steel Framing (Max JW=8")	CEJ 263P
Gypsum with EIFS Finish and Steel Framing (Max JW=8")	CEJ 264P
Gypsum with Aluminum or Steel Siding and Steel Framing (Max JW=8")	CEJ 265P
Glass, Aluminum Spandrel with Aluminum Framing (Max JW=8")	CEJ 307P
Glass Spandrel with I-shaped Aluminum Framing (Max JW=8")	CEJ 308P
Glass Spandrel with Aluminum Framing (Max JW=8")	CEJ 309P
Glass Spandrel with I-shaped Aluminum Framing (Max JW=8")	CEJ 310P
Gypsum with Brick Finish and Steel Framing (Max JW=6")	CEJ 314P
Gypsum with Cementitious Finish and Steel Framing (Max JW=6")	CEJ 315P
Gypsum with Plaster Finish and Steel Framing (Max JW=6")	CEJ 316P
GFRC Panels with steel framing (Max JW = 8")	CEJ 400P
Gypsum with various facades (Max JW = 9", including studs)	CEJ 421P
Gypsum wall with various facades. Steel framing starts and stops above and below floor (Max JW = 0")	CEJ 425P
Glas Spandrel with Aluminum Framing (vision glass at floor) (Max JW = 6")	CEJ 526P
Glass Spandrel Panel with Aluminum Framing (Max JW = 2") (25% vertical shear movement)	CEJ 529P
Gypsum with various facades (cantilevered studs) (100% vertical shear)	HI/BP 120-05 (11/20/10)
Glass Spandrel with Aluminum Framing (vision glass at floor) (Max JW = 8")	HI/BP 150-01 (7/13/12)

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SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Throughout the Work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture, passage of air, and transmission of sound or noise.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, drawings and general provisions of Contract including General, Special and supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Firestopping of floor, wall, and ceiling penetrations, and joint firestopping systems are specified in Sections 07 84 10 and 07 84 43.

1.02 SUBMITTALS

A. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
4. Provide a letter from the manufacturer's representative stating that the proposed sealants are appropriate to the use and location in this project.

B. Samples: Upon request of the Architect, submit Samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used. Provide samples of all exposed to view sealants to Architect for color selection.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

PART 2 - PRODUCTS

2.01 SEALANTS

A. Provide the following noise, moisture & air penetration sealants, or equals approved in advance by the Architect, where called for on the Drawings or otherwise required for a complete and proper installation.
   1. Horizontal Sealants
      a. Self-leveling, complying with ASTM C920-79, grade P, class 25;
      b. Acceptable products (or approved equal):
         1) "Vulkem 45, one-part;"
         2) Vulkem 245, two-part;"

   2. Vertical Sealants:
      a. Non-sag, complying with ASTM C920-79, type S, grade NS, class 25, use NT, M, A, and O;
      b. Acceptable products (or approved equal):
         1) Sonolastic NP-1 Chemrex Inc.
         2) Vulkem 116", one-part;
         3) "Vulkem 921", one-part;
         4) "Chem-Calk 100" Bostick Construction Products Div.
         5) "PRC RubberCalk 7000", one-part Product Research & Chemical Corp.
         6) GC-9 Synthacalk", Pecora Corp.

   3. Sealant Type D:
      a. Silicone (vertical surfaces only), complying with Fed Spec TT-S-01543A, class A, low modulus;
      b. Acceptable products (or approved equal):
         1) "Dow Corning 790 Sanitary Sealant;"

   4. Sealant Type E:
      a. Acrylic latex, complying with ASTM C834-76;
      b. Acceptable products (or approved equal):
         1) "Pecora AC 20";

   5. Acoustical Joint Sealants Type E:
      a. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
      b. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

c. Available Products:
   1) Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
   2) United States Gypsum Co.; SHEETROCK Acoustical Sealant.

6. Acoustical Sealant for Concealed Joints : Manufacturer's standard, nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
   a. Available Products:
      1) Pecora Corporation; BA-98.
      2) Tremco; Tremco Acoustical Sealant.

7. Sealant Type F:
   a. Acoustical sealant (interior concealed conditions only)
   b. Acceptable products (or approved equal):
      1) Sheetrock Acoustical Sealant.

8. Fire-stop Sealant complying with ASTM E84 and E814, UL 1479
   a. Acceptable products (or approved equal): See Specification Section 07840.

B. All sealants shall be reviewed and approved by the manufacturer as to the appropriateness of its application to the designated use. No sealant shall be selected or used for locations or conditions not in compliance with the manufacturer's recommendations.

C. For other services, provide products especially formulated for the proposed use and approved in advance by the Architect.

D. Colors:
   1. Colors for each sealant installation will be selected by the Architect from standard colors normally available from the specified manufacturer.
   2. Should such standard color not be available from an approved substitute manufacturer except at additional charge, provide such colors at no additional cost to the Owner.
   3. In concealed installations, and in partially or fully exposed installations where so approved by the Architect, use standard gray or black sealant.

2.02 PRIMERS

A. Use only those primers which have been tested for durability on the surfaces to be sealed and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials which are non-absorbent, non-staining, and specifically recommended for this installation by the manufacturer of the sealant used.

2.04 MASKING TAPE

A. For masking around joints, provide an appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, and which is removable without damage to substrate.

2.05 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Concrete and ceramic tile surfaces:
   1. Install only on surfaces which are dry, sound, and well brushed, wiping free from dust.
   2. At open joints, remove dust by mechanically blown compressed air if so required.
   3. To remove oil and grease, use sandblasting or wire brushing.
   4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
   5. Remove laitance and mortar from joint cavities.

B. Steel surfaces:
   1. Steel surfaces in contact with sealant:
      a. Sandblast as required to achieve acceptable surface for bond.
      b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale and rust.
      c. Use solvent to remove oil and grease, wiping the surfaces with clean white rags only.

   2. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.

C. Aluminum surfaces:
   1. Aluminum surfaces in contact with sealant:
      a. Remove temporary protective coatings, dirt, oil, and grease.
      b. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.

   2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION OF BACKUP MATERIAL

A. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

B. Installation tool:
   1. For installation of backup material, provide a blunt surfaced tool of wood or plastic, having shoulders designed to ride on the adjacent finished surface and a protrusion of the required dimensions to assure uniform depth of backup material below the sealant.
   2. Do not, under any circumstance, use a screwdriver or similar tool for this purpose.
   3. Using the approved tool, smoothly and uniformly place the backup material to the depth indicated on the Drawings or otherwise required, compressing the backup material 25% to 50% and securing a positive fit.

3.04 PRIMING

A. Use only the primer approved by the Architect for the particular installation, applying in strict accordance with the manufacturer's recommendations as approved by the Architect.

3.05 BOND-BREAKER INSTALLATION

A. Provide an approved bond-breaker where recommended by the manufacturer of the sealant, and where directed by the Architect, adhering strictly to the manufacturers' installation recommendations.

3.06 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.

B. Equipment:
   1. Apply sealant under pressure with power-actuated hand gun or manually-operated hand gun, or by other appropriate means.
   2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and completely mask joints where the appearance of primer or sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with the manufacturer's recommendations, thoroughly filling joints to the recommended depth. Sealant should be continuous without skips, gaps or voids.

E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.
   1. Provide uniformly smooth joints with slightly concave surface.
   2. Do not use tooling agent unless specifically so recommended in writing by the manufacturer of the sealant.

F. Sealants that, in the opinion of the Architect, are not properly installed according to the manufacturer's recommendations shall be totally removed. The joint shall be thoroughly cleaned, taking care to protect adjacent surfaces. New sealant shall be installed in accordance with these specifications and manufacturer's recommendations.

G. Cleaning up:
   1. Remove masking tape immediately after joints have been tooled.
   2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.
   3. Upon completion of the work of this Section, promptly remove from the job site all debris, empty containers, and surplus material derived from this portion of the Work.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS, WINDOWS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Standard hollow metal doors and frames for doors and windows.

B. Related Sections
1. Division 1 Section "Submittal Procedures" for shop drawing, product data and sample submittals.
2. Division 8 Sections "Prefinished Wood Doors" for doors installed in hollow metal frames and "Glazing" for glass lite in hollow metal frames and doors.
3. Division 8 Section "Door Hardware" for door hardware for hollow metal doors and/or frames.
4. Division 9 Sections "Painting" for field painting hollow metal doors and frames.

1.02 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated within 30 days of issuance or Notice to Proceed. Include construction details, material descriptions, core descriptions, and finishes.
1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. Shop Drawings: Include the following:
1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
5. Locations of reinforcement and preparations for hardware.

6. Details of each different wall opening condition.
7. Details of anchorages.
8. Details of accessories.

C. Other Action Submittals:
1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

D. Coordination with other trades:
1. Submittals shall flag areas of coordination with other trades or where materials that interface with materials specified herein are necessary. Indicate coordination of glazing frames and stops with glazing requirements; indicate coordination with finish hardware.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with CBC Section 715.4 and NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to UL 10B or UL 10C. Label all such doors and frames accordingly.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.
1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.07 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Fleming Door Products Ltd.; an Assa Abloy Group company.
4. Steelcraft; an Ingersoll-Rand company.
5. Republic Builders Products.
6. Security Metal Products; an Assa Alboy Group company.

B. Grout: USG

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized, 18 gage minimum.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

H. Glazing: Comply with requirements in Division 8 Section "Glazing".

I. Shop Applied Primer For Ferrous Metals: Manufacturer or fabricator's standard, fast-curing, lead free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated. Provide shop primer paint material that is compatible with finish paint systems indicated and is in compliance with the current EPA rules and regulations at the time and place of application.

2.03 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
   1. Design: Flush panel.
   2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
      a. Fire Door Core: As required to provide fire-protection ratings indicated.
   3. Vertical Edges for Single-Acting Doors: Beveled edge.
      a. Beveled Edge: 1/8 inch in 2 inches.
   4. Top and Bottom Edges: Closed with flush 0.042-inch- thick, end closures or channels of same material as face sheets.
   5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
   1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless). 16 gage faces.
   2. Exterior doors to be galvanized complying with ASTM A 525 (A60). Wipe coat galvanizing is not permitted.

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
   1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless). 16 gage faces.

2. Classroom doors shall have a foam core capable of providing a minimum STC 39 rating for the door.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.04 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.
6. Fabricate frames with mitered corners.
7. Fabricate frames as face welded unless otherwise indicated.
8. Frames for Level 3 Steel Doors: 0.067-inch (14 gage) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet.
1. Fabricate frames with mitered corners.
2. Fabricate frames as face welded unless otherwise indicated.
3. Frames for level 3 steel doors 0.053 inch (16 gage) thick sheet steel.
9. Frames for Wood Doors: 0.053-inch (16 gage) thick steel sheet.
10. Frames for borrowed lights: 0.053 inch (16 gage) thick sheet steel.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.05 FRAME ANCHORS

A. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
2. Post installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inchneight adjustment. Terminate bottom of frames at finish floor surface.

2.06 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.042 (18 gage) inch thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.042 (18 gage) inch thick, fabricated from same material as frames in which they are installed.

2.07 LOUVERS

J. Provide louvers for exterior and interior doors, where indicated, that comply with SDI 111C, with blades or baffles formed of minimum 0.020-inch thick, (24 gage) cold-rolled steel sheet set into 0.032-inch thick steel frame. Factory primed, rated when indicated by drawings. See mechanical drawings for size requirements.
1. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.
2. Fusible link type where indicated to be part of a rated assembly, minimum 14 gage construction.
3. Unless noted otherwise, all exterior louvered openings shall be screened.

2.08 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.
3. Astragals: Provide overlapping astragal on one leaf of pairs of doors. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush all joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

2. Side Light Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
5. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Three anchors per jamb up to 60 inches high.
      2) Four anchors per jamb from 60 to 90 inches high.
      3) Five anchors per jamb from 90 to 96 inches high.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
   b. Anchor Fasteners: #8 x ½" zinc coated self tapping hex washer head screws, provide two per strap.

6. Door Silencers: Except on gasketed doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silences.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
   c. Do not provide holes or silencers at openings receiving weatherstripping.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
   1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
   2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
   3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame molding on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.09 ACCESSORIES

A, Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

2.10 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
   2. Clean, treat, and paint (primer) exposed surfaces of steel door and frame units, including galvanized surfaces.
   3. Clean steel surfaces of mill scale, rust, oil, grease dirt, and other foreign materials before the application of paint.
   4. Apply shop primer evenly to provide uniformly finished surfaces ready for finish painting.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

D. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

E. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
   1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

F. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
   1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
      a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
      b. Install frames with removable glazing stops located on secure side of opening.
      c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
      d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
   3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
   4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout. Anchor type shall not obstruct filling the frame with grout.
   5. When detailed for installation in prepared openings in concrete construction (dimpled frames), provide sealant between frame and concrete in accordance with provisions of "Joint Sealers" Section of these Specifications.
   6. Windows shall have strap anchors within 12" of each corner and at 24" o.c. max. Fasten to framing with 8 d nails.

7. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within specified below. Shim as necessary. Comply with SDI-100.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
      d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
   2. Fire Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with hollow metal manufacturer's written instructions.
   1. Secure stops with countersunk flat-or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.04 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth all rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

SECTION 08 14 00

ALUMINUM CLAD WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Commercial Wood Doors with exterior Aluminum Cladding.

1.02 SYSTEM DESCRIPTION

B. Performance Requirements: Provide products/systems that have been manufactured, fabricated, and installed to the following performance criteria:
1. Structural Performance (ASTM E330): per Chapter 16 and 24, 2013 CBC
2. Air Infiltration Rate (ASTM E 283: 0.06 cfm/sq. ft. at static air pressure difference of 6.24 1bf/sq. ft. mínimum
3. U-Factor (NFRC 100): Not more than 0.57 Btu/sq. ft. x h x deg.F
4. Solar Heat Gain Coefficient (SHGC) (NFRC 200): see T-24 in drawings
5. Outdoor-Indoor Transmission Class (OITC) (ASTM E90) : Minimum of 34 OITC
6. Sound Transmission Class (STC) (ASTM E90): Minimum of 30 STC

C. Structural Requirements: Provide products/systems capable of withstanding wind loads based on testing units representative of those indicated for Project that pass AAMA/NWWDA 101/I.S.2/NAFS, Uniform Structural Load Test:
1. Design Wind Loads: Determine design wind loads applicable to Product from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 meters) above grade, according to ASCE, Section 6, based upon mean roof heights indicated on Drawings.
a. Basic Wind Speed: See drawings for design load criteria
b. Importance Factor: See drawings for design load criteria
c. Exposure Category: See drawings for design load criteria
d. Wind Load Requirement: See drawings for design load criteria

1.03 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data and installation guides.

D. Shop Drawings: Provide drawings indicating direction of operable parts, typical jamb, head and sill conditions, and special mullion reinforcement details.

E. Color Samples: Submit selection and verification samples, including the following:
1. Hardware: Submit samples indicating typical finish on window hardware.
2. Cladding: Submit color Samples of aluminum cladding.

F. Quality Assurance/Control Submittals: Submit the following:
   1. Performance Data: Provide manufacturer's published performance data for specified products.

G. Contract Closeout Submittals: Submit the following:
   1. Warranty documents specified herein.
   2. Owner's Manual: Bound manual clearly identified with project name, location, and completion date. Identify type and size of units installed. Provide recommendations for periodic inspections, care, and maintenance. Identify common causes of damage with instructions for temporary repair.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

B. Regulatory Requirements and Approvals: Doors and hardware shall comply with 2013 CBC for egress, and disabled access requirements.

C. Preinstallation Meetings: Participate in a preinstallation meeting in accordance w/Section 01 31 19.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 01 Product Requirements Section.

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

E. Store materials and accessories off ground, under cover, and protected from weather and construction activities.

1.06 PROJECT/SITE CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication. Record measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

B. Install units in accordance with manufacturer's safety and weather requirements.

1.06 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project Warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard limited warranty document. Manufacturer's limited warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

PART 2 - PRODUCTS

20.1 MANUFACTURER

A. Provide products from the following manufacturer:
1. Andersen Windows, Inc.
2. 100 4th Ave. N.
3. Bayport, MN 55003-1096.
4. Phone: (800) 299-9029.
5. Fax: (800) 752-9230.
6. E-mail: technicalsupport@andersenwindows.com.
7. www.andersenwindows.com.

2.02 MANUFACTURED UNITS

A. Proprietary Products/Systems. Aluminum clad Wood outswing doors, including the following:
1. Andersen® Architectural Commercial Doors.
2. Substitutions: No substitutions permitted.

2.03 MATERIALS

A. Frame Members: Aluminum storefront frame with stops provided by Section 08 41 13.
1. Frame Depth: 41/2" wide.

B. Aluminum Panel Cladding: Fabricate from 0.050 inch (1.3 mm) 6063-T5 aluminum in the following color:
1. Cladding Color: Clear anodized aluminum

C. Weatherstripping:

D. Stops: Integral with aluminum storefront frames per Section 08 41 13.

E. Sill: Aluminum Threshold by Section 08 71 11.

2.04 GLAZING

A. Clear Single Pane Glass Units: Clear, tempered glass conforming to ASTM C1048, Type 1, Class 1, q3, Kind FT.

B. High-Performance™ Low-E4™ Glass, Low SHGC, Argon Filled Insulating Glass Units:
1. Glass: Tempered insulating glass units consisting of an outboard and inboard lite of clear tempered glass conforming to ASTM C1048, Type 1, Class 1, q3, Kind FT.
2. Magnetron sputtering vapor deposition (MSVD) TiO2 coating applied to the No. 1 surface.

3. High-Performance™ Low-E4™ Glass Coating: Magnetron sputtering vapor deposition (MSVD) Low-E coating applied to the No. 2 surface.
4. Filling: Fill space between glass lites with argon gas blend.
5. Protective removable polyolefin film applied to glass surfaces No. 1 and No. 4.

2.05 HARDWARE

A. Prep doors in factory for hardware furnished by Section 08 71 00 and install in accordance with hardware manufacturers recommendations.

B. Hinges: 4-1/2 inch (114 mm) heavy duty ball bearing hinge with non-removable pin with the following finish:
1. Finish: White powder coated painted.
2. Finish: Satin Stainless Steel.
3. Finish: Oil Rubbed Bronze.

C. Locks: <Specify locks in this paragraph or refer to Division 08 Section "Door Hardware.

2.06 ACCESSORIES - NONE

2.07 FABRICATION

A. Preservative Treatment: Treat wood frame members and interior glazing stops after machining with a water repellent preservative in accordance with WDMA I.S.4.

B. Frame Components: Not Used

C. Door Panels:
1. Stiles and Rails: 1-3/4 inch (44 mm) engineered wood cores with laminated veneer interior face and aluminum clad or laminated veneer, exterior face.
2. Attach stiles to rails using mortise and tenon joints. Reinforce top and bottom rail joints with 5 inch by 3/8 inch (127 mm by 9 mm) diameter lag screws.
3. Clad exterior door panel surfaces with 0.050 inch (1.3 mm) aluminum cladding (clear anodized finish, not painted).
4. Door Panel Finishes:
   a. Interior Facing: Unfinished Maple for transparent finish in field by Section 09 91 00 to match prefinished interior wood doors.
   b. Exterior Color: Clear anodized finish

D. Glazing: Factory glazed with silicone glazing sealant applied to exterior glazing stops.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of unit manufacturer.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify that site conditions are acceptable for installation of units, including the following:
   1. Concrete surfaces are dry and free of excess mortar, rocks, sand, and other construction debris.
   2. Masonry openings are square and dimensions are correct.
   3. Aluminum storefront door frames are properly installed.
   4. Rough openings are square and dimensions are correct.
   5. Sill plates are level.

B. Do not proceed with installation of units until unacceptable conditions are corrected.

3.03 INSTALLATION

A. General:
   1. Remove unit components, parts, accessories, and installation guides from carton.
   2. Inspect unit components and verify that components are not damaged and that parts are included before disposing of carton.
   3. Shop-assemble multiple units before installation in accordance with manufacturer's installation guides.
   4. Field-assemble multiple units before installation in accordance with manufacturer's installation guides.

B. Interface With Other Work:
   1. Perform installation in accordance with Manufacturer's instructions.
   2. Install units level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
   3. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
   4. Install insulation in shim space around unit perimeter to maintain continuity of building insulation. Do not overfill.
   5. Hold back exterior siding or other finish materials from edge of unit to allow for expansion and contraction and installation of proper joint sealant with backing materials. Seal perimeter of unit after exterior finish is applied per requirements of Division 07 "Joint Sealants" Section.
   6. Finish interior units per requirements specified in related sections. Refer to, and comply with, additional requirements in manufacturer's installation guides.
   7. Install specified hardware and unit accessories after cleaning.

C. Site Tolerances:
   1. Adjust operation, insect screens, hardware, and accessories for a tight fit at contact points and weatherstripping for smooth operation and weathertight closure.

3.04 CLEANING

A. Clean units using cleaning material and methods specifically recommended by window manufacturer.

B. Remove excess sealants, glazing materials, dirt, and other substances.

C. Avoid damaging protective coatings and finishes.

D. Protect unit surfaces from masonry cleaning solution that could damage insulation glass panels or hardware.

E. Remove debris from work site and properly dispose of debris.

3.05 PROTECTION

A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 08 14 29

PRE-FINISHED WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Solid-core interior and exterior wood doors with hard wood-veneer faces.
2. Factory machining for hardware.
3. Factory finishing of wood doors.
4. Metal vision lite frames in wood doors with glazing indicated in drawings.
5. Hardwood faced door frames for paint finish where indicated

B. Related Sections:

1. Division 8 Section "Hollow Metal Doors, Windows and Frames for hollow metal frames to receive wood doors.
2. Division 8 Section "Door Hardware" for hardware for wood doors.
3. Division 8 Section "Glazing" for glass view panels in wood doors.
4. Division 9 Sections "Painting" for "Wood Stains and Transparent Finishes" for field touch-up of wood doors and painting of wood frames.

1.02 SUBMITTALS

A. Product Data: For each type of door and frames indicated. Include details of core and edge construction and trim for openings. Provide complete information on factory applied finishes.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door and frame; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.

C. Samples for selection/verification of wood species grain pattern and finish colors.

D. Warranty: Sample of special warranty.

1.03 QUALITY ASSURANCE

A. Source Limitations: Obtain wood-veneer doors from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with WI's "Manual of Millwork."

1. Provide WI-Certified Compliance Certificate indicating that doors and finishes comply with requirements of grades specified.
2. Provide WI-Certified Compliance Certificate for installation.
3. Pre-fitting and pre-hanging of doors is not permitted. All doors and hardware must be properly fitted in the field to their frames after the frames have been installed, painted, and required environmental conditions are attained.

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to CBC Section 713 and CSFM standard 12-43.4 "Standards for Fire Doors and Windows,

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.06 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/16" for width and 1/8" for height in a 36-by-84-inch door size.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty Period for Solid-Core Interior Doors: Life of installation.
3. Warranty Period for Solid-Core Exterior Doors: 2 years from substantial completion.

PART 2 - PRODUCTS

2.01 DOOR AND DOOR FRAME CONSTRUCTION, GENERAL

A. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2.
2. Blocking: Provide wood blocking in particleboard-core doors (where allowed/indicated) as follows:

a. 5-inch top-rail blocking, in doors indicated to have closers.
b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
c. 5-inch midrail blocking, in doors indicated to have exit devices.
d. 3-inch vertical edge rails, both side.

B. Hardwood faced door frames (WI Custom grade for paint finish):

1. Provide fire rated frames and matching non-rated frames indicated in door schedule and drawings.
2. Provide engineered wood base with hardwood veneer and solid stock faces for opaque field painting.

C. Acceptable manufacturers for wood doors and frames include the following:

1. VT Architectural Doors (basis of design).
2. Eggers Industries
3. Lynden Door
4. McFarland Door & Millwork

2.02 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium (Grade AA faces).
2. Species: White Maple or as selected by Architect.
3. Cut: Plain sliced, Rift cut, book matched or as selected by Architect.
4. Exposed Vertical Edges: Same species as faces.
5. Core: Particle Board or Mineral (at fire rated doors) with perimeter hardwood rails and blocking interlocked at edges.
6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press. Provide construction to achieve minimum 39 STC rating or as otherwise scheduled.

7. Provide fire resistant rated doors with UL or Warnock-Hersey labels as indicated in drawings or door schedule.

2.03 DOORS FOR OPAQUE FINISH

A. Interior Solid-Core Doors:

1. Grade: Custom.
2. Faces: Any closed-grain hardwood of mill option.
3. Exposed Vertical Edges: Any closed-grain hardwood.
4. Core: Particle Board or Mineral (at fire rated doors) with perimeter hardwood rails and blocking interlocked at edges.
5. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press. Provide construction to achieve minimum 39 STC rating or as otherwise scheduled.
6. Provide fire resistant rated doors with UL or Warnock-Hersey labels as indicated in drawings or door schedule.

2.04 LOUVERS AND LIGHT FRAMES

A. Metal Louvers:

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

a. Air Louvers Inc.
b. Anemostat; a Mestek company.
c. LL Building Products, Inc.; a division of GAF Materials Corporation.
d. Louvers & Dampers, Inc.; a Mestek company.

2. Blade Type: Vision-proof, inverted V.
3. Metal and Finish: Hot-dip galvanized steel, 0.0785 inch (14 gage) thick, factory primed for paint finish.
4. Provide approved fire rated assembly to meet fire rating indicated.
5. See mechanical drawings for size requirements.

B. Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch- thick (18 gage), cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated. Do not exceed size and location limitations of fire rating indicated.

2.05 FABRICATION

A. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules,

door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

B. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 8 Section "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.06 SHOP PRIMING/FINISHING

A. Doors for Opaque Finish: Shop prime doors with one coat of wood primer specified in Division 9 Section "Painting". Seal all four edges, edges of cutouts, and mortises with primer.

B. Doors for Transparent Finish: In the shop, prepare doors and apply sanding sealer, stain for tint as selected by Architect and minimum of three coats of clear transparent finish in accordance with manufacturer's recommended procedures for highest level non-yellowing hardcoat finish, and complying with WI requirements. Seal all four edges, edges of cutouts, and mortises with first coat of finish. At areas being remolded, match species and tint of existing adjacent doors that remain.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify door rough opening is properly sized, with level floor and head, and plumbs jambs prior to installation of wood door frames.
2. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs. Door frames are to be painted prior to installation of prefinished doors.
3. Reject doors and frames with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware" and Division 6 Section "Miscellaneous Carpentry".

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

C. Job-Fitted Doors: Align and fit wood door frames in rough openings and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer. Machine doors for hardware and fit only in accordance with hardware manufacturer's recommendations. Seal and finish edges of doors, edges of cutouts, and mortises after fitting and machining in the field as required by door manufacturer to maintain warranty.

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold with bottom seal is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold or top of finished flooring unless otherwise indicated or required for proper function without rubbing against adjacent finished floor surfaces.

3.03 FIELD QUALITY CONTROL

A. The owner reserves the right to request and pay for an inspection by a representative of the referenced organization to determine that the work of this section has been performed in accordance with the specified standards.

B. In the event such inspection determines the Work to be noncompliant, immediately remove noncompliant items and replace them with items complying with the specified requirement sat no additional cost to the Owner. The Owner shall be reimbursed the full charges for the inspection if nonconforming Work is found

3.04 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Access doors and frames for walls, ceilings and plaster soffits.

B. Related Sections include the following:
   1. Division 8 Section "Door Hardware" for mortise lock cylinders.
   2. Division 9 Sections for gypsum board and plaster assemblies. Division 9 Sections for special requirements related to special finishes.
   3. Plumbing, mechanical, electrical, and low voltage drawings and specifications for doors provided by respective disciplines.

1.02 SUBMITTALS

A. Product Data: For each type of access door and frame indicated. Include construction details, materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, hardware, and attachments to other work.

1.03 QUALITY ASSURANCE

A. Source Limitations: Obtain access door(s) and frame(s) through one source from a single manufacturer.

B. Size Variations: Obtain Architect's acceptance and approval of manufacturer's standard size units that may vary slightly from sizes indicated on Drawings

1.04 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to attic spaces, concealed plumbing, mechanical, electrical, fire alarm, fire sprinklers or other concealed work.

PART 2 - PRODUCTS

2.01 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
   1. ASTM A 123/A 123M, for galvanizing steel and iron products.
   2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with A60 zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

D. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
   2. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
      a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
   3. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.

E. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

F. Plaster Beads: Edge trim formed from 22 gauge galvanized perimeter plaster beads.

2.02 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Babcock-Davis; A Cierra Products Co.
   2. Dur-Red Products.
   3. J. L. Industries, Inc.
   4. Karp Associates, Inc.
   5. Larsen's Manufacturing Company.
   6. Milcor Inc.
   7. Nystrom, Inc.

B. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
   1. Locations: Wall and ceiling surfaces.
   2. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame.
   3. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
   4. Hinges: Spring-loaded, concealed-pin type.
   5. Latch: Cam latch operated by flush key with interior release.

C. Exterior Flush Access Doors and Frames with Exposed Trim: Weatherproof with extruded door gasket.
   1. Locations: Wall surfaces, plaster soffits.
   2. Door: Minimum 0.040-inch- thick, metallic-coated steel sheet; flush panel construction with manufacturer's standard 2-inch- thick fiberglass insulation.
   3. Frame: Minimum 0.060-inch- thick extruded aluminum.
   4. Hinges: Continuous piano, zinc plated.
   5. Lock: Preparation to accept a 1 1/8 inch mortise cylinder.
   6. Interior Latch Release: Mechanism to allow for panel to open from interior side-standard on all panels.

2.03 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
   1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
   2. Provide mounting holes in frames for attachment of units to metal framing.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
   1. For cylinder lock, furnish two keys per lock and key all locks alike.

E. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.02 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 35 13
ACCORDION FOLDING FIRE DOORS

PART 1 – GENERAL

1.01 SUMMARY OF WORK

A. Division 0 and 1, as indexed, apply to this section.

B. Furnish and install all horizontal sliding, accordion folding fire doors shown on the drawings and specified herein.

1.02 RELATED SECTIONS

A. All headers, support structures, fire protection of support structures, surrounding insulation, jambs, storage pockets, blocking and trim shall be furnished and installed by other sections.

B. All electrical wire, wiring, conduit and electrical boxes shall be furnished and installed by electrical section including connections to smoke detectors and building fire alarm panels.

C. Drilling/placement of anchorage points into pre or post tensioned decks, welding/punching/drilling steel members and all drywall work.

D. All track, soffit, chain guide and wall mounted striker pieces and integrated pocket cover door surface shall be painted by Section 09 91 00. Color shall be selected by the architect.

1.03 QUALITY ASSURANCE

A. Installation shall be performed by factory trained and certified installers with a minimum of three years' experience installing electrically operated accordion folding fire doors.

B. Fire doors shall be listed by Underwriters Laboratories for ratings as indicated, when tested in accordance with the requirements of UL 10B NFPA 252.

C. Automatic closing system shall be listed by Underwriters Laboratories in accordance with the requirements of UL 864 and be listed for use with the assembly in compliance with NFPA 80, Chapter 9.

D. Fire doors used for smoke and draft control shall bear the "S" mark on the fire door label and shall have an air leakage of less than 3 ft^3/ft^2 at 0.1 inch of water column pressure when tested in accordance with UL 1784 with an artificial bottom seal.

E. Fire Doors shall be capable of resisting an air pressure differential up to 0.05 inches of water column.

1.04 SUBMITTALS

A. See Section 0133 23 for submittal procedures.

B. Product Data: Provide manufacturer's technical literature, include UL listing data. Include information on optional operational upgrades for Owner's consideration and possible contract modification.

C. Shop Drawings: Indicate construction and installation details and dimensions, including layout, electrical requirements, required stack depth, height of header above finished floor, and requirements for anchorage and support of each door.

D. Operation and Maintenance Data: Operating procedures, troubleshooting and repair methods, and wiring diagrams.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver to the job site in manufacturer's original, unopened package, labeled to show name, brand and type.

B. Store products in a protected dry location. Replace damaged materials on-site at no cost to owner.

1.06 COORDINATION BY GENERAL CONTRACTOR

A. Coordinate with the following:

1. Fire Alarm system.

2. Electrical.

3. Pocket cover doors (if required).

4. Floor and ceiling finish.

B. Assure accurate installation of header, jamb, and trim. Provide "As-Built" dimensions for opening and storage pocket. Supervise unloading and handling of materials.

C. Store boxes flat (not more than three high) in a protected dry area. Replace damaged materials at no cost to owner.

D. Permanent power shall be in-place and ready for final connection when fire doors are installed. Assure access to and proper clearance for motor operators.

E. After testing the fire alarm system, automatic-closing fire doors shall be re-set to the original position.

1.07 WARRANTY

A. Materials and installation shall be warranted against defects in workmanship for a period of one (1) year from the date of substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Horizontal sliding accordion folding fire doors shall be Won-Door FireGuard Compressed Stack model FGCS60 as manufactured by Won-Door Corporation, Salt Lake City, UT. Contact: Cheryl L. Domnitch, P.E.; cdomnitch@wondoor.com, 510-460-8031

B. Alternate manufacturers will be considered for systems that meet or exceed all performance criteria and testing/agency approvals. Submit for consideration at least 14 days prior to bid date in accordance with Section 01 25 00 Substitution Procedures.

2.02 ACCORDION FIRE DOORS – GENERAL

A. Provide electrically powered self-closing fire doors of configurations indicated on the drawings.

1. Fire rating as required.

B. Fire Rating – Fire doors shall be listed by Underwriters Laboratory as special purpose fire doors having 60-minute fire protection rating in accordance with the requirements of UL 10B and NFPA 252.

C. Closing and Opening Operation: Automatic Closing System including motor operator and releasing devices shall be a Microprocessor-based system rated to UL864 (Releasing Device Control Unit) and shall commence closing upon activation by fire alarm system and/or by low battery charge.

1. Obstruction Detection: Contact with an obstruction shall cause the door to stop, reverse enough to remove pressure on the leading edge, pause, and then re-close when in an alarm condition.

2. While the door is opening under motor power, constant pressure to the leading edge in the direction of opening shall cause the door to continue to open until the leading edge is released. This is termed motor-assisted opening.

3. Constant pressure to the leading edge while not under motor power shall prevent motor operation and allow the door to be opened manually.

D. Exit Hardware Operation: Provide fire exit hardware on both sides of door.

1. In emergency mode, a slight pressure on the hardware will cause the door to open a minimum of 32 inches, pause for 3 seconds, and then automatically close.

2. The open distance shall be field programmable, up to the entire opening width.

3. The pause before re-close shall be field programmable up to 30 seconds.

4. The exit hardware shall have the ability when not in the emergency (fire) mode to be used to open the door and move it back into the storage pocket.

2.03 COMPONENTS

A. Door Construction: Two parallel, accordion-type walls independently suspended with no floor tracks, pantographs, or interconnections.

1. Panels: 24 gauge steel, V-grooved; modular in design; capable of in-place repair.

2. Perimeter Seals**:** shall consist of continuous extruded vinyl sweeps attached to the top and bottom of the fire door to form a smoke and draft seal.

3. Hanging Weight: 5.5 pounds per sq. ft. when extended across opening.

4. Finish: All steel parts factory-applied enamel.

5. Color: Manufacturer's standard platinum.

B. Suspension System: Two tracks, on 8 inch centers, attached to overhead structural support.

1. Tracks: .125 aluminum or 14 gauge cold rolled steel.

2. Panel Hangers: Every other panel is suspended by a steel hanger pin and ball bearing roller.

3. Lead Post Hangers: 16-gauge steel structural tube frame with 18-gauge steel preformed cover. The lead post shall function as an integrated cover panel over the storage pocket opening when the fire door is in the open position.

C. Power Supply: 120 volt power source to power supply for main power. On loss of AC power, the 12v/24v battery back-up system shall provide full operation capability.

D. Automatic Closing System shall be listed to UL864 including capability to send and receive signals from the Fire Control Panel, and shall consist of the following:

1. Microprocessor based Electronic Control box with the ability to:

a. Monitor dual power sources continually for peak performance including:

1) Detect a missing battery, bad battery, or low battery condition.

2) Detect if the charging circuit is bad.

3) Detect fuse failures.

4) Detect high or low AC conditions.

b. Monitor the health of the drive train.

c. Monitor inputs including: sticky door block, exit hardware, patron hardware, and key switches.

d. Run a "watch dog" monitoring circuit which will force a software restart in the event the software hangs, including tracking the number of resets that occur for diagnostic purposes.

e. Withstand voltages up to 120 volts AC on the fire alarm input circuit without damage including the ability to indicate that the alarm circuit has not been wired as a dry contact, "no voltage" circuit when errant voltages are applied to the circuit.

f. Communicate with other microprocessors on the system via an internal buss system.

g. Indicate faults or supervised information both locally and at a remote location.

2. Motor Operator Assembly including a DC gear-motor, drive sprocket, clutch, and position sensors. The motor shall drive the fire door by means of a chain attached to a stabilizer bar trolley. The motor shall be rated for continuous use with unlimited cycle duty.

3. If optional key switch is NOT used, A door control momentary rocker switch shall be mounted on one side of the door and shall function as follows:

a. Pressing the upper portion shall close the door and/or clear fault conditions.

b. Pressing the lower portion of the switch shall open the door and/or temporarily mute the local horn.

4. Leading Edge Obstruction Detector shall be pressure sensitive such that contact with an obstruction shall cause the door to stop, pause for 3 seconds, then re-close when in alarm mode. The obstruction detection system shall be fully functional at all times.

5. Exit Hardware will be located on both sides of each fire door.

E. The header shall be provided as an integrated part of the door assembly. It shall Include integrated self-supporting track, threaded rods and mechanical attachment hardware.

2.04 RELATED CONSTRUCTION

A. Track Support Construction: Provide supports attached to structure and mounting surface for track including drilling/placement of anchorage points into pre or post tensioned decks, welding/punching/drilling steel members, and all drywall work; comply with door manufacturer's instructions and recommendations.

B. Pocket Construction: Provide pocket for concealment of accordion door when open; comply with door manufacturer's instructions and recommendations.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that adjacent construction is suitable for installation of door.

B. Verify that electrical utilities have been installed and are accessible.

C. Verify that door opening is plumb and header is level and of correct dimensions.

D. Notify Architect of any unacceptable conditions or varying dimensions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions, shop drawings and NFPA 80.

B. Install fire doors plumb and level.

3.03 ADJUSTING

A. Adjust door installation to provide uniform clearances and smooth, quiet, non-binding operation.

B. Test that all operations are functional and meet the requirements of local codes.

3.04 CLEANING

A. Clean surfaces using manufacturer's recommended means and methods.

3.05 PROTECTION

A. Protect installed work from damage.

3.06 STORAGE OF WASTE AND RECYCLING

A. Store and recycle waste in accordance with Section 01 74 19 Construction Waste Management and Disposal.

END OF SECTION

SECTION 08 41 13

ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Exterior aluminum storefront framing for windows as indicated in drawings.
2. Exterior heavy duty aluminum door frames for wood stile and rail door by others as indicated in drawings.
3. All required integral hardware, accessories fasteners and structural reinforcing required for a complete durable water tight system.
4. Installation of glazing.

B. Related Sections:
1. Division 8 Section "Door Hardware" for hardware provided under that section.
2. Division 8 Section "Glazing" for Glazing Requirements to the extent not specified in this section.
3. Division 8 Section "Aluminum Windows" for punched openings.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Door hardware:

1.03 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.04 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Movements of supporting structure indicated on Drawings including, but not limited to deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:
   a. Deflection exceeding specified limits.
   b. Thermal stresses transferring to building structure.

c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
d. Noise or vibration created by wind and by thermal and structural movements.
e. Loosening or weakening of fasteners, attachments, and other components.
f. Sealant failure.
g. Failure of operating units.

C. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.

D. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 20 lbf/sq. ft.
1. Maximum Water Leakage: According to AAMA 501.1 no uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.

E. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

F. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.

G. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.57 Btu/sq. ft. x h x deg F when tested according to AAMA 1503 or as otherwise required by the Title-24 Envelope requirements and as indicated in the drawings.

H. Sound Transmission: Provide aluminum-framed systems with fixed glazing and framing areas having the following sound-transmission characteristics:
1. Sound Transmission Class (STC): Minimum 30 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

2. Outdoor-Indoor Transmission Class (OITC): Minimum 34 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

I. Design of Aluminum Framed Entrances and Storefronts shall meet the requirements of Chapters 16A and 24 of 2013 CBC.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, minimum half size scaled details, and attachments to other work.
1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior including adjacent flashing.
2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
3. Indicate adjacent items furnished or installed by others.

C. Samples for Initial Selection: Color charts for units with factory-applied color finishes to include standard and available special custom colors.

D. Samples for Verification: For each type of exposed finish required and colors selected in manufacturer's standard sizes, minimum 4" x 6".

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

F. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

G. Warranties: Sample of special warranties as listed in this section.

1.06 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

B. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

C. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      c. Failure of operating components.
      d. Water leakage through fixed glazing and framing areas.
      e. Adhesive or cohesive sealant failures.
   2. Warranty Period: Three years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
   1. Warranty Period: 15 years from date of Substantial Completion for organic color coat finish and 10 years for anodic finish.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Oldcastle Building Envelope Series 3000 2"x4-½" Multi-Plane Center Set thermally broken storefront system or comparable product by one of the following to match or exceed the basis-of-design system in style, performance, interface with adjacent construction and color, submitted under provisions for substitutions per Section 01 25 00, a minimum of 14 days prior to bid date.
   1. EFCO

2. United States Aluminum.
3. Kawneer North America

2.02 MATERIALS

A. Aluminum: Extruded 6063-T6 alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.

2.03 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken with a structural thermal barrier.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Center.
4. Provide heavy duty or reinforced frames where supporting doors, including stops.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum or stainless steel with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

D. Concrete and Masonry Inserts: Stainless steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

F. Exposed Flashing: Form exposed flashings from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visable deflection.

G. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

2.04 GLAZING SYSTEMS

A. Glazing: As specified in Division 8 Section "Glazing." Storefront to accommodate 1" insulated glass assemblies unless specifically indicated otherwise or thicker assemblies are required for compliance with structural deflection criteria.

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.05 ENTRANCE DOOR SYSTEMS – NOT USED (by Section 08 14 00 & 08 14 29)

A. Entrance Door Hardware: As specified in Division 8 Section "Door Hardware."

2.06 SLIDING SERVICE WINDOWS – NOT USED

2.07 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.08 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from exterior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
8. Provide integral door stops for doors provided by others (verify thickness),

D. Storefront Framing: Fabricate components for assembly using a system that is compatible with the adjacent existing system.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

F. Entrance Doors: Provide by Section 08 14 00 and 08 14 29.

G. Hardware Installation: Factory install hardware to frames to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.09 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M12C22A41/A44, Class I, 0.7 mils or thicker.
1. Color: Etched, medium matter, clear anodic coating, clear anodized or etched, medium matte, dark bronze colored anodic coating as selected by Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify door opening size and hardware requirements with door suppliers for wood doors provide by others prior to beginning aluminum frame installation.

B Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General:
1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure non-movement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or

tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.

2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior. Coordinate with installers of adjacent framing, finishes and flashings systems to assure a complete weathertight assembly at head, jambs and sill. Provide flashings compatible with storefront system where not indicated to be provided by other trades/sections as required for weathertight installation.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

F. Install glazing as specified in Division 8 Section "Glazing."

G. Entrance Doors: Wood doors to be installed by others.

H. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" to produce weathertight installation.

3.03 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet vertically and 1/8 inch in 20 feet horizontally; 1/4 inch over total length.
2. Alignment:
a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.04 CLEANING

A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Solid and tubular extruded aluminum windows with thermally broken frames in punched openings of the following type(s):

Horizontal Slider	Series 1120 (Milgard)
Radius	Series R20 (Milgard)

2. Provide windows as shown in drawings and specified here.

B. Related Sections:

1. 08 41 13 – Aluminum Framed Entrances and Storefronts
2. 08 80 00 – Glazing

1.02 SUBMITTALS

A. Reference Section 01 33 23 – Submittal Procedures; submit following items:

1. Product Data.
2. Shop Drawings: Include window schedule, window elevations, sections and details, and multiple window assembly details.
3. Samples:
   a. Color samples: Minimum 1x4 inch (25x100 mm) samples of Aluminum with painted or anodized color.
   b. Glass, showing specified tint color and insulated unit assembly.
4. Quality Assurance/Control Submittals:
   a. Qualifications: Proof of manufacturer's qualifications.
   b. U-Factor and structural rating charts required for AAMA and NFRC beling requirements.
   c. Installation Instructions – AAMA 2400 (“Mounting Flange Installation”)

B. Closeout Submittals: Reference Section 01 77 19 – Project Closeout and Record Documents submit following items:

1. Temporary window labels marked to identify windows that labels were applied to.

2. Maintenance instructions.
3. Special Warranties.

1.03 QUALITY ASSURANCE

A. Overall Standards: Comply with ANSI/AAMA 101.I.S.2, except as otherwise noted herein.

B. Qualifications:

1. Manufacturer Qualifications:
   a. Minimum five years experience in producing aluminum windows of the type(s) specified.
   b. Member AAMA, NFRC.

C. Regulatory Requirements:

D. Certifications for insulated glass windows:

1. AAMA: Windows shall be Gold Label certified with label attached to frame per AAMA requirements.
2. NFRC: Windows shall be NFRC certified with temporary U-factor label applied to glass and an NFRC tab added to permanent AAMA frame label.

1.04 DELIVERY, STORAGE AND HANDLING

A. Reference section 01 61 00 - Product Requirements.

B. Follow manufacturer's instructions on label applied to windows.

1.05 WARRANTY

A. Commercial Special Warranty:

1. 10-year guarantee.
2. Guarantee windows against defects in manufacturing and workmanship including costs for parts and labor.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Milgard Manufacturing, Inc.
1010 54th Avenue East
Tacoma, WA 98424

Tel: 1.800.MILGARD (645-4273)
(253) 922-2030
Fax: (253) 926-0848

B. Window Series: Milgard TIE Aluminum Windows

C. Substitutions: Reference Section 01 25 00 – Substitution Procedures. Submit a minimum of 14 days prior to bid date for consideration.

2.02 MATERIALS

A. Aluminum: Comply with requirements of AAMA/WDMA/CSA 101/I.S.2/A440-05, 6063-T5 temper for strength, corrosion resistance and application of required finish (clear anodized).

B. Extruded frame members are to be .060" in thickness for structural walls.

2.03 GENERAL PERFORMANCE REQUIREMENTS:

A. Thermal Performance: Comply with NFRC 100.

B. Air Leakage, Water Resistance, Structural Test: Comply with ANSI/AAMA 101/I.S.2.

C. Forced-Entry Resistance: Comply with ASTM E 588.

2.04 WINDOW TYPES:

A. Picture Window and Radius – R20 Series, 1 3/8 inch (35mm) nail fin setback:

1. Frame:
    a. R20 Series, 2 ¼" (57mm)
2. Sightlines:
    a. R20 Series, equal to 1 5/16"
3. Performance Class:
    a. R20 Series, 71 ½" x 71 ½" and smaller: F-HC40

B. Horizontal Slider – 1120 Series, 1 3/8 inch (35mm) nail fin setback:

1. Frame:
    a. 1120 Series, 2 5/8" (67mm)
2. Sash: Depth of 1 1/8" (29 mm), solid aluminum extrusion.
3. Sightlines: Non-equal sightlines between sash and fixed glass.
4. Performance Class:
    a. 143 ½" x 59 ½" and smaller: HS-R20.
5. Hardware:
    a. Nylon rollers with stainless steel axles, aluminum integral monorail track.
    b. Single pull rail on meeting rail sash.

c. Automatic, spring loaded, height adjustable positive lock.

6. Weatherstripping: Fin seal polypropylene pile.

2.05 GLAZING

A. Insulated Glass Units: ASTM E 774, Class A, 1 inch (25 mm) thick overall.

1. Glazing Type: Comply with insulating glass unit requirements in Section 08 80 00, Glazing.

2.06 INSECT SCREENS

A. Provide tight-fitting screen for operating sash with hardware to allow easy removal.

1. Screen Cloth: Charcoal colored fiberglass mesh.
2. Frame:
   a. Cambered formed aluminum with rigid plastic corner keys.
   b. Pull tabs for removal.

2.07 FABRICATION

A. Fabricate frames and sash with mechanically joined corners. Corners are fastened with corrosion resistant screws and sealed with an acrylic sealant.

B. All fixed glass is exterior glazed and all sashes are marine glazed with flexible PVC glazing. The fixed glazing shall be removed without disassembly of a sash. The vents will need to be disassembled to replace the glazing.

2.08 FINISHES

A. Frame and Sash Color: Clear Anodized Exterior Finish: Provide AA-C22-A31 Class II Clear finish, minimum 0.4 mils thick, electrolytically deposited color anodized finish.

B. Color match screen frame to window frame and sash color.

2.09 SOURCE QUALITY CONTROL

A. Windows inspected in accordance with manufacturer's Quality Control Program as required by AAMA Gold Label certification.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine openings in which windows will be installed.

1. Verify that framing complies with AAMA 2400 ("Mounting Flange Installation") or AAMA 2410 ("Flush Fin Installation").

2. Verify that fasteners in framed walls are fully driven and will not interfere with window installation.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of substrate conditions.

3.02 INSTALLATION

A. Install windows in framed walls in accordance with AAMA 2400 ("Mounting Flange Installation") or AAMA 2410 ("Flush Fin Installation").

B. Do not remove temporary labels.

C. Install insect screens on operable sash.

3.03 CLEANING

A. Reference Section 01 74 19 – Cleaning and Waste Management.

B. Remove temporary labels and retain for Closeout Submittals.

C. Clean soiled surfaces and glass using a mild detergent and warm water solution with soft, clean cloths.

END OF SECTION

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SECTION 08 71 11

DOOR HARDWARE

GENERAL

RELATED DOCUMENTS

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

SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following, but is not necessarily limited to:

1. Door Hardware, including electric hardware.
2. Storefront and Entrance door hardware.
3. Gate Hardware.
4. Digital keypad access control devices.
5. Power supplies for electric hardware.
6. Thresholds, gasketing and weather-stripping.
7. Door silencers or mutes.
8. Installation of door hardware (prep by door and frame manufacturers),

C. Related Sections: The following sections are noted as containing requirements that relate to this Section, but may not be limited to this listing.

1. Division 8: Section - Steel Doors and Frames.
2. Division 8: Section - Wood Doors and Section -Aluminum Clad Wood Doors
3. Division 8: Section - Aluminum Storefront
4. Division 28: Section - Fire/Life-Safety Systems & Security Access Systems.

REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE.)

A. 2013 California Building Code, CCR, Title 24.

B. BHMA – Builders' Hardware Manufacturers Association

C. CCR – California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

D. DHI – Door and Hardware Institute

E. NFPA - National Fire Protection Association.

1. NFPA 80 - Fire Doors and Other Opening Protectives
2. NFPA 105 - Smoke and Draft Control Door Assemblies

F. UL - Underwriters Laboratories.

1. UL 10C - Fire Tests of Door Assemblies
2. UL 305 - Panic Hardware

G. WHI - Warnock Hersey Incorporated

H. SDI - Steel Door Institute

SUBMITTALS & SUBSTITUTIONS

A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.

B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Submit six (6) copies of schedule organized vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:

1. Include a Cover Sheet with;
   a. Job Name, location, telephone number.
   b. Architects name, location and telephone number.
   c. Contractors name, location, telephone number and job number.
   d. Suppliers name, location, telephone number and job number.
   e. Hardware consultant's name, location and telephone number.

2. Job Index information included;
   a. Numerical door number index including; door number, hardware heading number and page number.
   b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
   c. Manufacturers' names and abbreviations for all materials.
   d. Explanation of abbreviations, symbols, and codes used in the schedule.
   e. Mounting locations for hardware.
   f. Clarification statements or questions.
   g. Catalog cuts and manufacturer's technical data and instructions.

3. Vertical schedule format sample:

Heading Number 1 (Hardware group or set number – HW -1)					
			(a) 1 Single Door #1 - Exterior from Corridor 101	(b) 90°	(c) RH
			(d) 3' 0"x7' 0" x 1-3/4" x (e) 20 Minute (f) WD x HM		
(g) 1	(h)	(i) ea	(j) Hinges - (k) 5BB1HW 4.5 x 4.5 NRP (l) ½ TMS	(m) 626	(n) IVE
2	6AA	1 ea	Lockset - ND50PD x RHO x RH x 10-025 x JTMS	626	SCH

(a) - Single or pair with opening number and location. (b) - Degree of opening (c) - Hand of door(s) (d) - Door and frame dimensions and door thickness. (e) - Label requirements if any. (f) - Door by frame material. (g) - (Optional) Hardware item line #. (h) - Keyset Symbol. (i) - Quantity. (j) - Product description. (k) - Product Number. (l) - Fastenings and other pertinent information. (m) - Hardware finish codes per ANSI A156.18. (n) - Manufacture abbreviation.

D. Make substitution requests in accordance with Division 1. Substitution requests must be made a minimum of 14 days prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.

E. Wiring Diagrams: Provide product data and wiring and riser diagrams for all electrical products listed in the Hardware Schedule portion of this section.

F. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

G. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

H. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.

I. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.

QUALITY ASSURANCE

A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Responsible for detailing, scheduling and ordering of finish hardware.
2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing.
3. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.

C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort, and shall not require tight gripping, tight pinching or twisting of the wrist to operate.

DELIVERY, STORAGE AND HANDLING

A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.

B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.

C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.

D. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

WARRANTY

A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:

1. Locksets: "L" Series (3) years – "ND" Ten (10) years.
2. Electronic Locks: One (1) year.
3. Closers: Thirty (30) years –1260 twenty (20) years –Concealed High Security fifteen (15) years --except electronic closers shall be two (2) years.
4. Exit devices: Three (3) years.
5. All other hardware: Two (2) years.

MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PRE-INSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to beginning work of this section.

B. Attendance: Architect, Construction Manager, Contractor, Security Contractor, Hardware Supplier, Installer, and Key Personnel.

C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review Owner's keying standards.

PRODUCTS

MANUFACTURERS

Item	Manufacturer	Acceptable Substitutes
A. Hinges	Ives	Hager, Stanley, McKinney
B. Locks, Latches & Cylinders	Schlage	Or Approved Equal
C. Exit Devices	Von Duprin	Or Approved Equal
D. Closers	LCN	Or Approved Equal
E. Push, Pulls & Protection Plates	Ives	Trimco, BBW, DCI

F.	Flush Bolts	Ives	Trimco, BBW, DCI
G.	Dust Proof Strikes	Ives	Trimco, BBW, DCI
H.	Coordinators	Ives	Trimco, BBW, DCI
I.	Stops	Ives	Trimco, BBW, DCI
J.	Overhead Stops	Glynn-Johnson	Or Approved Equal
K.	Thresholds	Zero	Pemko, National Guard
L.	Seals & Bottoms	Zero	Pemko, National Guard

MATERIALS

A. Hinges: Exterior out-swinging door butts shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.

1. Hinges shall be sized in accordance with the following:
   a. Height:
      1) Doors up to 42" wide: 4-1/2" inches.
      2) Doors 43" to 48" wide: 5 inches.
   b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
   c. Number of Hinges: Furnish 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.

2. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.

B. Floor Closers: Shall be equipped with compression springs, cam and roller operating mechanism and a one piece spindle-cam for maximum operating performance and longevity.

C. Pivots: High strength forgings and castings with precision bearings for smooth operation. Positive locking vertical adjustment mechanism to allow installer to precisely position the door and balance the load.

D. Continuous Hinges: As manufactured by Ives, an Allegion Company. UL rated as required.

E. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" design, fastened with through-bolts and threaded chassis hubs.

1. Locksets to comply with ANSI A156.2, Series 4000, Grade 1; tested to exceed 3,000,000 cycles. Locksets shall meet ANSI A117.1, Accessible Code.
2. Chassis: One piece modular assembly and multi-functional allowing function interchange without disassembly of lockset.

3. Spindle shall be deep-draw manufactured not stamped. Spindle and spring cage to be one-piece integrated assembly.
4. Anti-rotation plate to be interlocking to the lock chassis. Lock design utilizing bit-tabs are not acceptable.
5. Lever Trim: Accessible design, bi-directional, independent assemblies.
6. Locks shall be of such construction that when locked, the door may be opened from within by using lever and without the use of a key or special knowledge.
7. Thru-bolts to secure anti-rotation plate without sheer line. Fully threaded thru-bolts are not acceptable.
8. Spring cage to have double compression springs. Manufacturers utilizing torsion springs are not acceptable.
9. Latchbolt to be steel with minimum ½" throw deadlatch on keyed and exterior functions; ¾" throw anti-friction latchbolt on pairs of doors.
10. Strikes: ANSI curved lip,1-1/4" x 4-7/8", with 1" deep dust box (K510-066). Lips shall be of sufficient length to clear trim and protect clothing.

F. Extra Heavy duty Commercial Mortise Locks: Schlage "L" Series as scheduled with "06" Style Lever and "A" Style Rose.

1. Locksets to comply with ANSI A156.13, Series 1000, Operational Grade 1 and Security Grade 1 with all standard trims. Locksets shall also comply with UL10C Positive Pressure requirements
2. Lock case shall be manufactured with heavy 12 gauge steel with fully wrapped design. Lock cases with exposed edges are not acceptable. Lock case shall be multi-functional allowing transformation to a different function without opening lock case.
3. Latchbolt shall have ¾" throw and be non-handed, field reversible without opening the lock case. Solid latchbolts and / or plastic anti-friction devices are not acceptable.
4. The deadbolt, when used, shall be 1" throw stainless steel with a ¾" internal engagement when fully extended.
5. All trim shall be through-bolted with the spring cages supporting the trim attached to the lock cases to prevent torquing.
6. Levers to have independent rotation in both directions. Exterior lever assembly to be one-piece design attached by threaded bushing. Interior lever assembly shall be attached by screwless shank
7. Thru-bolt lever assemblies through the door for positive interlock. Locks using a through the door spindle for attachment are not acceptable. Spindles shall be independent, designed to "break-away" at a maximum of 75psi torque.
8. Hand of lock chassis to be changeable by simply moving one screw from one side to the case to the other and pulling and reversing the latchbolt.
9. Cylinders to be secured by a cast stainless steel, dual retainer. Locks utilizing screws and / or stamped retainers are not acceptable.

G. Deadlocks: Rotating cylinder trim rings of attack-resistant design. Mounting plates and actuator shields of plated cold-rolled steel. Mounting screws of ¼" diameter steel and protected by drill-resistant ball bearings. Steel alloy

deadbolt with hardened steel roller. Strike alloy deadbolt with reinforcer and two 3" long screws. ANSI A156.5, Grade 1 certified.

H. Exit devices: Von Duprin as scheduled.

1. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 standards.
2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
3. Mechanism case shall have an average thickness of .140".
4. Compression spring engineering.
5. Non-handed basic device design with center case interchangeable with all functions.
6. All devices shall have quiet return fluid dampeners.
7. All latchbolts shall be deadlocking with ¾" throw and have a self-lubricating coating to reduce friction and wear.
8. Device shall bear UL label for fire and or panic as may be required.
9. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
10. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon with a minimum of .130" thickness, match lockset lever design.
11. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
12. Furnish glass bead kits for vision lites where required.
13. All Exit Devices to be sex-bolted to the doors.
14. Panic Hardware shall comply with CBC Section 11B.404.2.7 and shall be mounted between 34" and 44" above the finished floor surface.
    a. The unlatching force shall not exceed 15 lbs. applied in the direction of travel.
    b. Provide exit devices UL certified to meet maximum 5 pound requirements according to the California Building Code section 11B-309.4, and UL listed for Panic Exterior Fire Exit Hardware.

I. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.

1. Door closer cylinders shall be of high strength cast iron construction with double heat treated pinion shaft to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.
2. All door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 11/16 inch and piston diameter of 1 inch to ensure longevity and durability under all closer applications.
3. All parallel arm closers shall incorporate one piece solid forged steel arms with bronze bushings. 1-9/16" steel stud shoulder bolts, shall be incorporated in regular arms, hold-open arms, arms with hold open and stop built in. All other closers to have forged steel main arms for strength,

durability, and aesthetics for versatility of trim accommodation, high strength and long life.

4. All parallel arm closers so detailed shall provide advanced backcheck for doors subject to severe abuse or extreme wind conditions. This advanced backcheck shall be located to begin cushioning the opening swing of the door at approximately 45 degrees. The intensity of the backcheck shall be fully adjustable by tamper resistant non-critical screw valve.
5. Closers shall be installed to permit doors to swing 180 degrees.
6. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.
7. Provide the manufactures drop plates, brackets and spacers as required at narrow head rails and special frame conditions. NO wood plates or spacers will be allowed.
8. Maximum effort to operate closers shall not exceed 5 lbs., such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the closer may be increased but shall not exceed 15 lbs. when specifically approved by fire marshal. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. Door shall take at least 5 seconds to move from an open position of 90 degrees to a position of 12 degrees from the latch jamb (CBC Section 11B-404.2.8.1).
9. Provide sex-bolted or through bolt mounting for all door closers.

J. Flush Bolts & Dust Proof Strikes: Automatic Flush Bolts shall be of the low operating force design. Utilize the top bolt only model for interior doors where applicable and as permitted by testing procedures.

1. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
2. Provide dust proof strikes at openings using bottom bolts.

K. Door Stops:

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
2. Do not install floor stops more than four (4) inches from the face of the wall or partition (CBC Section 11B-307).
3. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.

L. Protection Plates: Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and

mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.

M. Thresholds: As Scheduled and per details.

1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection".
3. Use ¼" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
4. Thresholds shall comply with CBC Section 11B-404.2.5.

N. Seals: Provide silicone gasket at all rated and exterior doors.

1. Fire-rated Doors, Resilient Seals: UL10C Classified complies with NFPA 80 & NFPA 252. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements.
2. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C Classified complies with NFPA 80 & NFPA 252. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.
3. Smoke & Draft Control Doors, Provide UL10C Classified complies with NFPA 80 & NFPA 252 for use on "S" labeled Positive Pressure door assemblies.

O. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.

P. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

KEYING

A. Furnish a Schlage masterkey system as directed by the owner or architect. Key system to be designated and combinated by the Schlage Master Key Department even if pinned by the Authorized Key Center, Authorized Security Center or a local authorized commercial dealer.

B. A detailed keying schedule is to be prepared by the owner and/or architect in consultation with a representative of Allegion or an Authorized Key Center or Authorized Security Center. Each keyed cylinder on every keyed lock is to be listed separately showing the door #, key group (in BHMA terminology), cylinder type, finish and location on the door.

C. Establish a new masterkey system for this project as directed by the keying schedule.

D. Furnish all cylinders in the Schlage Full Size Interchangable Core (FSIC). Pack change keys independently (PKI)

E. Furnish construction keying for doors requiring locking during construction.

1. For FSIC systems provide 23-030-ICX Full Size Construction Cores
2. For FSIC systems provide ten 48-101-ICX Construction Keys
3. For FSIC systems provide two 48-056-ICX Control Keys (const.)
4. For FSIC systems provide two control keys for installing the permanent cores (49-056 for "Classic" keyways, 48-052-XP for "Classic Primus") (49-003 for "Everest Conventional", 48-005–XP for "Everest Primus")

F. Furnish all keys with visual key control.

1. Stamp key "Do Not Duplicate".

G. Furnish mechanical keys as follows:

1. Furnish 2 cut change keys for each different change key code.
2. Furnish 1 uncut key blank for each change key code.
3. Furnish 6 cut masterkeys for each different masterkey set.
4. Furnish 3 uncut key blanks for each masterkey set.
5. Furnish 2 cut control keys cut to the top masterkey for permanent I/C cylinders.
6. Furnish 1 cut control key cut to each SKD combination.

FINISHES

A. Generally to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.

B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.

C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.

D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.

FASTENERS

A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.

B. Screws for butt hinges shall be flathead, countersunk, full-thread type.

C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.

D. Provide expansion anchors for attaching hardware items to concrete or masonry.

E. All exposed fasteners shall have a phillips head.

F. Finish of exposed screws to match surface finish of hardware or other adjacent work.

G. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

EXECUTION

INSPECTION

A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

C. Fire-Rated Door Assembly Inspection: Upon completion of the installation, all fire door assemblies shall be inspected to confirm proper operation of the closing device and latching device and that only the manufacturer's furnished fasteners are used for installation and that it meets all criteria of a fire door assembly per NFPA 80 (Standard for Fire Doors and Other Opening Protectives) 2013 Edition. A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The inspection of the swinging fire doors shall be performed by a certified FDAI (Fire Door Assembly Inspector) with knowledge and understanding of the operating components of the type of door being subjected to the inspection. The record shall list each fire door assembly throughout the project and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.

B. Use the templates provided by hardware item manufacturer.

C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 34" and 44" AFF.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.

G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.

H. Hardware Installer shall coordinate with security contractor to route cable to connect electrified locks, panic hardware and fire exit hardware to power transfers or electric hinges at the time these items are installed so as to avoid disassembly and reinstallation of hardware.

I. Hardware Installer shall also be present with the security contractor when the power is turned on for the testing of the electronic hardware applications. Installer shall make adjustments to solenoids, latches, vertical rods and closers to insure proper and secure operation.

J. All wiring for electro-mechanical hardware mounted on the door shall be connected through the power transfer and terminated in the interface junction box specified for in the Electrical Section.

K. Conductors shall be minimum 18 gage stranded, multicolored. A minimum 12 in. loop of conductors shall be coiled in the interface junction box. Each conductor shall be permanently marked with its function.

L. If a power supply is specified in the hardware sets, all conductors shall be terminated in the power supply. Make all connections required for proper operation between the power supply and the electro-mechanical hardware. Provide the proper size conductors as specified in the manufacturer's technical documentation.

ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surface soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.

E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

HARDWARE LOCATIONS

A. Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

FIELD QUALITY CONTROL

A. Hardware supplier is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

SCHEDULE

A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.

B. The Door Schedule on the Drawings indicates which hardware set is used with each door.

Manufacturers Abbreviations (Mfr.)

GLY	=	Glynn-Johnson Corporation	Overhead Door Stops
IVE	=	Ives	Hinges, Pivots, Bolts, Coordinators, Dust Proof &
			Strikes, Push Pull & Kick Plates, Door Stops Silencers
LCN	=	LCN	Door Closers
ZER	=	Zero	Thresholds, Gasketing & Weather-stripping
SCE	=	Schlage Electronics	Electronic Door Components
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices

SPEXTRA: 283123

HARDWARE GROUP NO. 01 - EXTERIOR PAIR / ENTRY

FOR USE ON MARK/DOOR #(S):
01 04 05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA	TWO PT CLASSRM LOCK	LM9270T 06A	626	SCH
2	EA	FSIC CORE	23-030	626	SCH
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS444	626	IVE
1	EA	GASKETING	188S-BK	S-BK	ZER
1	EA	MEETING STILE	328AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	PER DETAIL		

HARDWARE GROUP NO. 02 - EXTERIOR / ACCESS CONTROL

FOR USE ON MARK/DOOR #(S):
02 03 10

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	630	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS444	626	IVE
1	EA	GASKETING	188S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	PER DETAIL		
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 03 - EXTERIOR / ACCESS CONTROL

FOR USE ON MARK/DOOR #(S):
06 07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	630	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	100S ADJ	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	188S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	PER DETAIL		
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 04 - EXTERIOR PAIR / MECH

FOR USE ON MARK/DOOR #(S):
08

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA	MANUAL FLUSH BOLT	FB457	626	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
2	EA	WALL STOP/HOLDER	WS45 (INSTALL AT TOP OF DOOR)	626	IVE
1	EA	GASKETING	188S-BK	S-BK	ZER
1	EA	ASTRAGAL	43SP	SP	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	PER DETAIL		

HARDWARE GROUP NO. 05 - EXTERIOR PAIR / ELEC

FOR USE ON MARK/DOOR #(S):

09

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA	MANUAL FLUSH BOLT	FB457	626	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP & HOLDER	100H ADJ	630	GLY
1	EA	WALL STOP/HOLDER	WS45 (INSTALL AT TOP OF DOOR)	626	IVE
1	EA	GASKETING	188S-BK	S-BK	ZER
1	EA	ASTRAGAL	43SP	SP	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	PER DETAIL		

HARDWARE GROUP NO. 06 - EXTERIOR / EXIT ONLY PANIC HARDWARE

FOR USE ON MARK/DOOR #(S):
11

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	AX-99-EO	626	VON
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	FLOOR STOP	FS444	626	IVE
1	EA	GASKETING	188S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	PER DETAIL		

HARDWARE GROUP NO. 07 - INTERIOR / ACCESS CONTROL

FOR USE ON MARK/DOOR #(S):
12

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	100S ADJ	630	GLY
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 08 - INTERIOR / ACCESS CONTROL

FOR USE ON MARK/DOOR #(S):
13 15 16 18 19 20
23

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 09 - INTERIOR / DUTCH DOOR / ACCESS CONTROL / MEDS

FOR USE ON MARK/DOOR #(S):
14

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	DOOR BOLT	B680 BOLT THROWS INTO LOWER LEAF	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP & HOLDER	100H ADJ	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 10 - INTERIOR / UNISEX TOILET

FOR USE ON MARK/DOOR #(S):
17

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE

HARDWARE GROUP NO. 11 - INTERIOR / ACCESS CONTROL / PANTRY

FOR USE ON MARK/DOOR #(S):
21

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 12 - INTERIOR / JANITOR

FOR USE ON MARK/DOOR #(S):

22

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP & HOLDER	100H ADJ	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

HARDWARE GROUP NO. 13 - INTERIOR / ACCESS CONTROL / RECEPTION

FOR USE ON MARK/DOOR #(S):
24

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	FLOOR STOP	FS436	626	IVE
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 14 - INTERIOR / STORAGE

FOR USE ON MARK/DOOR #(S):
25

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	100S ADJ	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

HARDWARE GROUP NO. 15 - INTERIOR / EXERCISE ROOM

FOR USE ON MARK/DOOR #(S):
26

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS436	626	IVE

HARDWARE GROUP NO. 16 - INTERIOR / RATED / UNISEX TOILET

FOR USE ON MARK/DOOR #(S):
27

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HARDWARE GROUP NO. 17 - INTERIOR / RATED / LAUNDRY / ACCESS CONTROL

FOR USE ON MARK/DOOR #(S):
28 31

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	1461 FC	689	LCN
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 18 - INTERIOR / RATED / READING ROOM

FOR USE ON MARK/DOOR #(S):
29

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	1461 FC	689	LCN
1	EA	FLOOR STOP	FS436	626	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HARDWARE GROUP NO. 19 - INTERIOR / RATED / STORAGE

FOR USE ON MARK/DOOR #(S):
30

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	1461 FC	689	LCN
1	EA	FLOOR STOP	FS436	626	IVE
1	SET	GASKET	PER SELECTED DOOR MFGR		

HARDWARE GROUP NO. 20 - INTERIOR / SHOWER

FOR USE ON MARK/DOOR #(S):
32 37 43 44 49 50
55

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7255J SET	626	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	EMER. STOP ASSEMBLY	299AB	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE

HARDWARE GROUP NO. 21 - INTERIOR / BDRM / ACCESS CONTROL

FOR USE ON MARK/DOOR #(S):
33 34 35 36 39 40
41 42 45 46 47 48
51 52 53 54

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092TEU 06A	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: CARD READER AND WIRING BY ACCESS CONTROL SECTION. VERIFY POWER SUPPLY REQUIREMENTS.

HARDWARE GROUP NO. 22 - INTERIOR / SHOWER / ACC BATHROOM

FOR USE ON MARK/DOOR #(S):
38

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7255J SET	626	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	EMER. STOP ASSEMBLY	299AB	630	IVE
1	EA	FLOOR STOP	FS436	626	IVE

HARDWARE GROUP NO. 23 - MISC PARTS

FOR USE ON MARK/DOOR #(S):
MISC

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	POWER SUPPLY	PS904 900-2RS 900-2RS	LGR	VON

NOTE: THE QUANTITY OF POWER SUPPLIES IS TO BE DETERMINED.

HARDWARE GROUP NO. 24 - EXTERIOR PAIR OF GATES / VERIFY GATE CLOSER WILL WORK WITH THE WEIGHT OF THE GATE.

FOR USE ON MARK/DOOR #(S):
G1

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CANE BOLT	BY GATE MFG		
1	EA	DOOR PULL, 1" ROUND	8103EZHD 10" O	630	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
4	EA	GATE CLOSER	108SF AT90W (MFG. SURE CLOSE)	BLK	
2	EA	FLOOR STOP	FS444	626	IVE

HARDWARE GROUP NO. 25 - EXTERIOR / SINGLE GATE. / VERIFY GATE CLOSER WILL WORK WITH THE WEIGHT OF THE GATE.

FOR USE ON MARK/DOOR #(S):
G2 G3 G4

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	GATE CLOSER	108SF AT90W (MFG. SURE CLOSE)	BLK	
1	EA	FLOOR STOP	FS444	626	IVE
			BALANCE OF HARDWARE BY GATE MANUFACTURER		
1	EA	DOOR PULL, 1" ROUND	8103EZHD 10" O	630	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Windows, including for storefronts.
   2. Door lites for doors not specified to include glazing.
   3. Interior borrowed lites.
   4. Fire rated glazing and framing system.

B. Related Sections:
   1. Division 8 Section "Hollow Metal Doors, Windows and Frames"
   2. Division 8 Section "Prefinished Wood Doors" and "Aluminum Clad Wood Doors"
   3. Division 8 Section "Aluminum Framed Entrances, and Storefronts"

1.02 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.03 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to

remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
   1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   2. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
      a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
      b. Solar Heat Gain Coefficient: NFRC 200.
      c. Solar Optical Properties: NFRC 300.

1.04 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- square Samples for glass.
   1. Each color of clear or tinted float glass.
   2. Fire rated glass.
   3. Insulating glass for each designation indicated.
   4. Laminated glass.
   5. For each color (except black) of exposed glazing sealant indicated.

C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
   1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.
   3. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

E. Product Test Listings and Reports: For each of the following types of glazing products:
   1. Insulating glass.
   2. Glazing sealants.
   3. Glazing gaskets.
   4. Fire Resistant Glazing

F. Qualification Data: For installers.

G. Warranties: Special warranties specified in this Section.

1.05 QUALITY ASSURANCE

A. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass coated float glass and insulating glass.

B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

C. Safety Glazing Products: Comply with CBC Section 2406, with testing requirements in 16 CFR 1201 and, for wired glass, with ANSI Z97.1.
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency or manufacturer acceptable to authorities having jurisdiction.
   2. Where glazing units, including Kind FT glass are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
   2. Glazing Standards: GANA Glazing Manual and Sealant Manual

E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.

F. Fire Rated Glass: Each lite shall bear a permanent, non-removable label of Underwriters Laboratories and/or Intertek Testing Services (Warnock-Hersey) certifying it for use in tested and rated fire protective assemblies.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.08 WARRANTY

A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. Warranty Period: 10 years from date of Final Completion.

B. Fire rated glazing and frame system: 5 years from date of Final Completion.

1.09 REFERENCES

A. ASTM E 119 – Fire Tests of Building Construction Materials.

B. ASTM E 2010 – Standard Test method for Positive Pressure Fire Tests of Window Assemblies.

C. ASTM E 2074 – Standard Test Method for Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

D. ASTM F 1915 – Standard Test Methods for Glazing for Detention Facilities.

E. CSFM – Fire Tests for Doors and Window Assemblies.

F. GANA – Glazing Manual.

G. GANA – Sealant Manual.

H. NFPA 80 – Fire Doors and Windows.

I. NFPA 251 – Fire Test for Fire Endurance of Building Construction and Materials.

J. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies.

K. NFPA 257 – Standard on Fire Test for Window and Glass Block Assemblies.

L. UL 9 – Fire Tests of Window Assemblies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Products: Subject to compliance with requirements, provide one of the products specified.
   3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
   5. Basis-of-Design Product: The design for each glazing product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.02 GLASS PRODUCTS - GENERAL

A. Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
   1. Comply with glass design requirements specified in Part 1 "Performance Requirements" article.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
   1. Comply with glass design requirements specified in Part 1 "Performance Requirements" article.

2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.
6. Where indicated in drawing for Spandrel Glazing provide Kind HS float glass with ceramic frit on the backside (face 4) @ inner pane of dual glazed unit. Frit color to be selected by the Architect to match adjacent glass. Glass shall be a minimum of 1/4" thickness.

C. Laminated Glass: ASTMC 1172, and complying with other requirements specified and with the following:

1. Interlayer: Polyvinyl butyral or cured resin of .03 inch thickness or as otherwise indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
   a. For polyvinyl butyral interlayers, laminate lites in autoclave with heat plus pressure.
   b. For cured-resin interlayers, laminate lites with laminated-glass manufacturer's standard cast-in-place and cured-transparent-resin interlayer.
2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

D. Wired Glass: ASTM C 1036, Type II (patterned and wired flat glass), Class 1 (clear), Quality-Q-6; and of form and mesh pattern specified.

E. Fire Rated Glass (20 minute door lites): ASTM E 2010, ASTM E 2074, monolithic, radiant heat reducing flat glass. Manufactured by Safti First, or approved Equal.

F. Fire Rated Glazing (45 minute corridor wall windows): TGP Circular windows in field built framing with metal L-angles as indicated in drawings. Glazing to be minimum 3/16 inch thick impact resistant "Firelite" by TGP with 45 minute rating, tested in accordance ASTM E-163 and UKL I0C.

G. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
1. Comply with glass design requirements specified in Part 1 "Performance Requirements" Article.

2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
3. Sealing System: Dual seal, with primary and secondary sealants as follows:
   a. Manufacturer's standard sealants.
4. Spacer Specifications: Manufacturer's standard spacer material and construction, color as selected by architect.

2.03 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
   1. EPDM, ASTM C 864.
   2. 1/8" x 3/8" closed cell PVC tape at fire rated glazing.

2.04 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:
   1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   1. Single-Component Neutral or Basic-Curing Silicone Glazing Sealants:
      a. Available Products:
         1) Dow Corning Corporation; 790.
         2) GE Silicones; SilPruf LM SCS2700.
         3) Tremco; Spectrem 1 (Basic).
      b. Type and Grade: S (single component) and NS (nonsag).
      c. Class: 100/50.
      d. Use Related to Exposure: NT (nontraffic).
      e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.

1) Use O Glazing Substrates: Coated glass and galvanized steel.

f. Applications: Glazing in steel window frames.

2.05 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.06 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements. Refer to the glass schedule at the end of this section.

1. MONOLITHIC FLOAT-GLASS UNITS
   a. Uncoated Clear Float-Glass Units: Class 1 (clear) float glass annealed or Kind HS (heat-strengthened) float glass where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with system performance requirements Kind HS (heat-strengthened) float glass or Kind FT (fully tempered) float glass.
      1) Thickness: As indicated by drawings and schedule.
2. LAMINATED GLASS
   a. Clear glass (unless otherwise indicated for tint), thickness as indicated by drawings and schedule for sound, safety and/or security purposes.
3. MONOLITHIC FIRE RATED-GLASS UNITS
   a. As indicated in Sections 2.02, E and F.
4. INSULATING-GLASS UNITS
   a. Passive Solar Low-E Insulating-Glass Units:

1) Basis-of-Design Product: PPG Clear Solarban 70 insulating glass or a comparable product.
2) Overall Unit Thickness: 1 inch.
3) Interspace Content: Argon gas
4) Outdoor Lite: 1/4" annealed float glass.
   a. Color: Clear by PPG Industries, Inc.
   b. Kind FT (fully tempered) where indicated or required by codes for safety glazing.
5) Indoor Lite: Clear annealed float glass 1/4 inch thick.
   a. FT (fully tempered) where indicated or required by codes for safety glazing.
6) Low-E coating on Number 2 layer at exterior windows.

5. Color: All interior glazing shall be clear and exterior glazing shall have clear lites or shall be tinted where otherwise specifically indicated.
6. Provide Kind HS (heat strengthened) glass in lieu of float glass where needed to resist thermal stresses induced by differential shading.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep system.
   3. Minimum required face or edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the complete work.

3.03 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.04 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and

blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.05 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.06 GLASS SCHEDULE

Glass types for doors, windows in punched openings and storefront systems shall be as follows, unless otherwise indicated on drawings:

A. Storefront Systems: Provide 1" insulated units per paragraph 2.06, A, 4 above.

B. Aluminum Windows; See specifications section 08 51 13 Aluminum Windows. Window manufacturer to provide 1" insulating units per paragraph 2.06, A, 4 pre-installed in window frames.

C. Aluminum clad wood doors: See specification Section 08 14 00. Door manufacturer to provide 1" insulating units per paragraph 2.06, A, 4 above, pre-installed in doors.

D. Windows; 1/4" nominal clear laminated sound/safety glass: All non-fire-rated interior door and window locations, except as indicated otherwise for fire rated glazing.

E. Corridor fire rated door lites: 3/8" clear 20 minute fire resistance rated glazing complying with CBC Section 715.4.3: All new interior one-hour fire rated corridor locations in 20 minute fire rated doors for door vision lite glazing (exempt from hose stream test). See paragraph 2.02 E.

F. Corridor Fire Rated Windows: Fire Rated windows: 45 minute clear Firelite Glazing. See paragraph 2.02 F.

END OF SECTION

SECTION 08 91 00

LOUVERS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: Provide wall louvers complete, in-place, with all miscellaneous metal and accessories required to complete the project as indicated on the drawings.

B. Related Work Included in Other Sections:
1. Section 05 12 00, Structural Steel.
2. Section 05 50 00, Metal Fabrications.
3. Section 07 62 00, Sheet Metal Flashing and Trim
4. Section 09 24 00, Portland Cement Plaster

1.02 QUALITY ASSURANCE:

A. Obtain louvers through one source from a single manufacturer that has been manufacturing louvers for at least 15 years.

1.03 SUBMITTALS:

A. General: Comply with Section 01 33 00 Submittal Procedures.

B. Shop drawings: Shop Drawings, along with catalog cuts, templates, and erection and installation details, as appropriate, for all miscellaneous metal items shall be submitted. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation with relation to the building construction.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General: All materials shall be new and the best of their respective kinds, of standard sizes, and shapes as indicated and/or detailed for the work intended.

B. EXTRUDED ALUMINUM DRAINABLE HEAD WALL LOUVERS
1. Model No.: ELF375DX and ELF375DXH, by: "Ruskin", or equal. Size as indicated on the drawings. Provide bird screen (painted flat black) behind exterior wall louvers.

C. Fasteners:
1. General: Provide stainless steel fasteners for exterior use and where built into exterior walls. Do not use metals that are incompatible with joined materials.
2. Standards: Use types and sizes to suit installation conditions. All fasteners shall comply with:
a. Nails, Spikes, and Staples: Section 2304.9 CBC, Galvanized for exterior applications, high humidity locations and treated wood; plain finish for other interior locations; size to suit application. Comply with Table 2304.9.1. Use common nails only.
b. Bolts, Nuts, Washers, Lags, Pins and Screws: Section 2304.9 CBC, sized to suit application, galvanized for exterior locations, high humidity locations and treated wood, plain finish for other interior locations. Full diameter body bolts per ASSME B18.2.1 (.2) or B18.2.6 for structural applications.

D. Screen:
1. 3/4" x 0.51" expanded, flattened aluminum birdscreen in removable frame, only at exterior wall louvers.

2.02 DELIVERY AND STORAGE OF MATERIALS:

A. Deliver materials in time to insure uninterrupted progress of the work. Store materials to preclude damage and permit ready access for inspection and identification of each shipment. Store materials above ground. Keep material free from dirt, grease, and other foreign matter, and protect form corrosion.

2.03 FABRICATION:

A. Workmanship:
1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in the finished product.
2. Work to dimension shown or accepted on the Shop Drawings, using proven details of fabrication and support. Verify all dimensions at job site.
3. Use type of materials shown or specified for the various components of the Work.
4. Form exposed work true to line and level, with accurate angles and surfaces and with straight sharp edges.
5. Ease the exposed edges to a radius of approximately 1/32 inch unless otherwise shown.

6. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
7. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush; match and blend with adjoining surfaces.
8. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, use Philips flat-head (countersunk) screws or bolts.
9. Provide for anchorage of the type shown. Coordinate with supporting structure. Fabricate and space the anchoring devices to provide adequate support for intended use.
10. Cut, reinforce, drill, and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

B. Finish:
1. Anodized (clear or color) or Kynar 500/Hylar 5000 in custom color as selected by Architect.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLTION:

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting and Placement:
1. Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications.
2. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims; but if protruding, cut off flush with edge of the bearing plate before packing with grout.
3. Provide temporary bracing or anchors in formwork for items which are to be built into concrete or similar construction.
4. Fit exposed connections accurately together to form tight hairline joints.
5. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.

3.03 PROTECTION AND CLEANING:

A. Remove all soil and foreign matter from finished surfaces and apply such protective measures as may be required to prevent damage or discoloration of any kind until acceptance of project.

B. Protection shall be provided by strippable coating, protective sleeves, polyethylene sheets, boarding, or any other suitable means during fabrications, shipment, site storage, and erection to prevent damage to the finished work due to stains, discolorations, scratches, or any other cause. Damaged elements shall be replaced as damages occur.

C. After installation, and after danger of subsequent damage has passed, remove all protective coverings from all exposed surfaces, and clean those surfaces of all soil and discoloration, ready for acceptance.

END OF SECTION

SECTION 09 24 00

PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Exterior Portland cement plasterwork (stucco) on metal lath plaster bases
2. Exterior Portland cement plaster work on metal lath over solid wood sheathing or other substrates indicated.
3. Air/Water resistant barrier below all plaster assemblies.
4. Installation of metal and self-adhering flexible flashings at openings and perimeter terminations.

B. Related Sections include the following:
1. Division 6 Section "Miscellaneous Carpentry" for wood framing, furring, sheathing and grounds utilized below or included in Portland cement plaster assemblies.
2. Division 7 Section "Building Insulation" for thermal insulations and vapor retarders included in Portland cement plaster assemblies.
3. Division 7 Section "Joint Sealants" for sealants installed with exterior Portland cement plaster (stucco).
4. Division 7 Section "Sheet Metal Flashing and Trim" for sheet metal and self adhering flexible membrane flashings to be installed by this section in conjunction with underlayment and lath at wall openings and edges.

C. References:
1. ASTM C578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
2. ASTM C847 Standard Specification for Metal Lath
3. ASTM C897 Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plaster
4. ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster
5. ASTM C1063 Standard Specification for Installation of Lathing and Furring for Portland Cement Based Plaster

1.02 SUBMITTALS

A. Product Data: For each color and type of product indicated, or required for plaster assemblies including all trim, screeds, reveals and miscellaneous accessories.

B. Samples for Initial Selection: For each type of factory-prepared finish coat indicated.

C. Samples for Verification: For each type of textured finish coat indicated; 24 inch by 24 inches, and prepared on rigid backing.

D. Warranty: Sample warranty for review and approval and executed warranty at closeout.

1.03 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Shall have marketed stucco assemblies in United States for at least ten years and shall have completed projects of same general scope and complexity.
2. Applicator: Shall be experienced and competent in installation of stucco materials, and shall provide evidence of a minimum of five years experience in work similar to that required by this section.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver stucco assembly materials in original packaging with manufacturer's identification.

B. Store materials inside under cover, off the ground and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.05 PROJECT CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Exterior Plasterwork:
1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.
1. Sunlight Exposure: Avoid, when possible, installation of the stucco assembly materials in direct sunlight. Application of finishes in direct sunlight in hot weather may adversely affect aesthetics.
2. Prior to installation, the substrate shall be inspected for surface contamination, or other conditions that may adversely affect the performance of the stucco assembly materials, and shall be free of residual moisture.

1.06 WARRANTIES

A. Air/Water Resistive Barrier: 10 year manufacturer's product and labor warranty covering entire barrier and flexible flashing assembly for water holdout performance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   3. Air/water resistive barrier system shall be as manufactured by Dupont Tyvek. Submit other products under provisions for substitutions per Section 01 25 00, a minimum of 14 days prior to bid date.

2.02 METAL LATH

A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
   1. Available Manufacturers:
      a. Alabama Metal Industries Corporation (AMICO).
      b. California Expanded Metal Products Company (CEMCO).
      c. Dale/Incor.
      d. Unimast, Inc.
      e. Western Metal Lath & Steel Framing Systems.
   2. Diamond-Mesh Lath: Self-furring, 1/4" minimum, for use over solid substrates.
      a. Weight: 2.5 lb/sq. yd.
   3. Flat Rib Lath: Rib depth of not more than 1/8 inch, for use over studs or stripping spaced 16" o.c. maximum.
      a. Weight: 3.4 lb/sq. yd.
   4. 3/8-Inch Rib Lath:
      a. Weight: 4.3 lb/sq. yd. for horizontal use on ceilings and soffits

2.03 ACCESSORIES

A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Zinc and Zinc-Coated (Galvanized) Accessories: Fabricate from 26 gage or heavier hot-dip galvanized steel, prime-coated unless otherwise specifically approved by the Architect.

1. Available Manufacturers:
   a. Alabama Metal Industries Corporation (AMICO).
   b. California Expanded Metal Products Company (CEMCO).
   c. Dale/Incor.
   d. Unimast, Inc.
   e. Western Metal Lath & Steel Framing Systems.

2. Use manufacturer's standard shapes specifically designed for the proposed use, including but not limited to the following:
   a. Grounds, screeds: 26 gage galvanized, size as required to provide for plaster thickness and as indicated in drawings.
      1) **Type A** – Base Screed: Stockton 5" W-S (#7) with weep holes.
      2) **Type AxI** – Foundation Screed: Stockton XLF (7/8"x 3 ½"x 2 ½")
      a) **Type B** – Plaster Ground: Stockton J-B, with weep holes at bottom edge of plaster panels for drainage.
      3) **Type C** – Ventilation screeds: Stockton 3" SES.
   b. Corner reinforcement: Fabricated from expanded metal with large openings, from welded or woven galvanized, or otherwise treated to give superior corrosion resistance.
      1) **Type D** – Outside corner bead: AMICO X-1.
      2) **Type E** – Inside corner bead: AMICO #30.
   c. Cornerite: Minimum 1.75 metal lath, coated with rust-inhibited paint, or woven or welded wire fabric of minimum No. 19 gage wire (or weighing not less than 1.7 pounds per square yard), galvanized after weaving or welded, unless fabricated from galvanized wire, when shaped for angle reinforcing shall have outstanding legs of no less than two inches.
   d. Strip reinforcement: Minimum 1.75 metal lath, coated with rust-inhibited paint, or woven or welded wire fabric of minimum No. 19 gage wire (or weighing not less than 1.7 pounds per square yard), galvanized after weaving or welded, unless fabricated from galvanized wire; minimum width of strip, three inches.
   e. Control and Expansion Joints: Fabricated from minimum 26 gage galvanized steel sheets, plain, perforated or expanded flange:
      1) **Type F** – Expansion/control screed: AMICO #15.
   f. Drip Mould: Fabricated from minimum 24 gage galvanized steel sheets, with large perforations:
      1) **Type G** – Soffit Drip Mould: Stockton #12 without weep holes.
   g. Special/custom: shapes and reveals or preformed standard pieces as indicated in the drawings, installed watertight per manufacturer's recommendations (submit product information for architect's approval) which include (but not limited to) the following:
      1) **Type H** – Aluminum Reveal molding: Stockton TRM 3/4" x 3/4".
      2) **Type I** – Aluminum Channel Screed: Stockton PCS 3/4" x 1" or as indicated.
      3) **Type J** – Aluminum Offset Screed: Stockton custom. See plans.

4) Other shapes not listed but required for complete watertight plaster system with clean, durable terminations that prevent water from entering the plaster system or building framing or allowing surface water from flowing back on underside of eaves and soffits.

C. Air/Water Resistive Barrier: DuPont Tyvek Commercial Wrap D with Dupont 3" Tyvek seam tape at barrier spems, Straight Flash self-adhering membrane at fasteners and opening jambs, and Dupont Flex Wrap at corners of all sills/heads of openings that fold onto jambs for a complete Flashing System with10 year warranty. Provide an additional layer of 15 pound asphalt impregnated felt over air/water resistive barrier for a double layer beneath lath and plaster installed over sheathing and other solid substrates.

2.04 MISCELLANEOUS MATERIALS

A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063. Use screws only 1/2" minimum diameter head, suitable for metal or wood framing as applicable. Nails and staples are not allowed.

2.05 PLASTER MATERIALS

A. Portland Cement 3 Coat System (scratch, brown & finish): ASTM C 150, Type II.
1. Color for Finish Coats: As selected by Architect from full line of standard and special/custom colors. Integral color finish coat to be troweled to a highly smooth finish that will receive a paint coating.

B. Plastic Cement: ASTM C 1328.

C. Colorants for Job-Mixed Finish-Coats: Colorfast mineral pigments that produce finish plaster color to match existing cement plaster finish or new colors as selected by Architect from manufacturer's full range of colors. Plaster finish cot color will be selected to match closely to final paint coat color.

D. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.

E. Sand Aggregate: ASTM C 897.
1. Use very fine sand aggregate in brown coat and where indicated for highly smooth troweled finish (typical at all exterior walls and nsoffits).

2.06 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.

B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

1. Portland Cement Mixes:
   a. Scratch Coat: For cementitious material, mix 1 part Portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
   b. Brown Coat: For cementitious material, mix 1 part Portland cement and 3/4 to 1-1/2 parts lime. Use 3 to 5 parts fine aggregate per part of cementitious material (sum of separate volumes of each component material).

C. Job-Mixed Finish-Coat Mixes:
   1. Portland Cement Mix: For cementitious materials, mix 1 part Portland cement and 3/4 to 1-1/2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material (sum of separate volumes of each component material). Use very fine sand or ceramic aggregate where indicated for highly smooth troweled finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Conduct a prestart meeting prior to installation of air/water resistant barrier after substrate is installed with barrier manufacturer's representative present. Manufacturer's representative shall make periodic observations of barrier installation to assure barrier is properly installed per manufacturer's recommendations prior to installation of lath and plaster.

B. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

C. Prepare solid-plaster bases that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

3.03 INSTALLATION, GENERAL

A. Thermal and Sound Attenuation Insulation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

B. Install air/water resistive barrier system per manufacturer's recommendations and in accordance with referenced standards with sealed laps to shed moisture to the exterior. Install sheet metal flashing at heads, jambs and sills of all openings and seal water tight with self-adhering flexible membrane flashing, min. 6" wide as recommended by membrane manufacturer. Install air/water resistive barrier over plywood wall sheathing at wood framed and metal framed walls that are part of the outer thermal envelope. Where lath and plaster is installed directly over solid substrates such as plywood, glass-mat gypsum sheathing, etc., (without rigid insulation) at vertical walls provide an additional layer of 15 pound roofing felt over air/water resistive barrier for a double layer beneath lath and plaster. At sloped plaster walls, install air/water resistive barrier over sheet waterproofing installed per Section 07 13 13 over sheathing.

3.04 INSTALLING METAL LATH

A. Expanded-Metal Lath: Install according to ASTM C 1063.
   1. Partition Framing and Vertical Furring: Install flat rib lath.
   2. Flat-Ceiling and Horizontal Framing: Install high rib lath.
   3. On Solid Surfaces, Not Otherwise Furred: Install self-furring diamond-mesh lath.
   4. Use stainless steel screw fasteners of sufficient length to securely attach lath to wall and ceiling/soffit framing (1/2" minimum penetration through metal stubs, 1" minimum penetration into wood framing).

3.05 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings.

B. Reinforcement for External Corners:
   1. Install lath-type external-corner reinforcement at exterior locations.

C. Control Joints: Install control or expansion joints in specific locations approved by Architect for visual effect as follows:
   1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
      a. Vertical Surfaces: 144 sq. ft.
      b. Horizontal and other Nonvertical Surfaces: 100 sq. ft.
   2. At distances between control joints of not greater than 18 feet o.c.
   3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
   4. Where expansion joints occur in surface of construction directly behind plaster.
   5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corners of doors, windows and other openings where stress points occur.

3.06 PLASTER APPLICATION

A. General: Comply with ASTM C 926.
   1. Do not deviate more than plus or minus 3/16 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface, 1/4" cumulative.
   2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
   3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Plaster Finish Coats: Apply to provide textured or smooth water troweled finish as indicated and selected/approved by Architect.

3.07 CUTTING AND PATCHING

A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.08 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work. Promptly remove plaster from doorframes, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 28 13

TILE BACKER BOARD

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Cement backer boards for tiled walls.
   2. 10 mil. polyethylene moisture barrier.

1.02 RELATED DOCUMENTS

A. Related Sections include the following:
   1. Division 6 Section "Miscellaneous Carpentry" for wood framing, furring, and subflooring.
   2. Division 7 Section "Building Insulation" for thermal and acoustical insulation.
   3. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces and substrates
   4. Division 9 Section "Gypsum Board" for gypsum drywall.
   5. Division 9 Section "Tiling" for ceramic tile.

1.03 SUBMITTALS

A. Product data: Submit manufacturer's data for each type of component and system specified, including performance ratings, details of construction, materials, and installation instructions.

B. Test Reports: Submit test reports from qualified testing laboratories indicating compliance with fire and sound resistance requirements.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain backer board and installation accessories from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Comply with pertinent codes and regulations of authorities having jurisdiction, and with standards for materials and installation in the "Handbook for Ceramic Tile Installation", latest edition, published by the Tile Council of American, Inc. P.O. Box 326, Princeton, NJ 08542-0326.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A137.1 for labeling sealed tile packages.

B. Store materials under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack tile backer boards to prevent sagging; stack flat, on continuous surface, and without skids.

C. Handle tile backer boards to prevent damage to edges, ends or surfaces. Remove damaged or deteriorated materials from site. Prevent damage or contamination to materials by water, freezing, foreign matter and other causes.

1.06 PROJECT CONDITIONS

A. Cold Weather Protection: In cold weather, maintain continuous, uniform, building temperatures of not less than 45 deg F or more than 100 deg. F for a minimum period of 48 hours prior to, during, and following tile backer board and tile installation.

B. Conditioning: Store tile backer board in spaces where it is to be installed for 48 hours prior to installation. Do not install board when it is wet.

C. Ventilation: Ventilate building spaces as required to remove excess moisture.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. C-Cure; C-Cure Board 990.
2. Custom Building Products; Wonderboard.
3. Georgia Pacific (DENS-SHIELD)
4. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
5. USG Corporation; DUROCK cement board.

2.02 BACKER BOARD PRODUCTS

A. Interior Tile Backer Board: aggregated Portland cement board with vinyl-coated, woven glass-fiber mesh embedded in back and front surfaces.
1. Thickness: 5/8 inch or as required to match existing work.
2. Size: 3 feet wide; 4, 5, or 6 feet long.
3. Faces: Smooth on one side, textured on other side.

4. Edges: Formed smooth edges; square cut ends.
5. Weight: 3.5 pounds per square foot.
6. Flexural Strength: 750 psi minimum per ASTM C 947.
7. Compressive Strength: 2300 psi minimum with 1 inch diameter disk per ASTM D2394.
8. Nail Pull Resistance: 125 lbs. minimum per ASTM C 473.
9. Flame Spread, Smoke Developed: 5, 0 per ASTM E 84.

2.03 JOINT REINFORCEMENT:

A. Glass-fiber tape, vinyl coated, open-weave tape; 2 inches wide; pressure-sensitive. Of the same manufacturer as the cement board. Embed in tile setting mortar or adhesive.

2.04 FASTENERS:

A. Self-drilling screws with corrosion resistant finish.
   1. Over metal studs: Screws with flat wafer head capable of being driven flush to surface of tile backer board; 1-1/4 inch long.
   2. Over Wood Studs: Type W non-rusting wood screws. 1-5/8" long.
   3. When tile backer board is installed over gypsum board base layer, screws shall be 5/8 inches longer.

2.05 OTHER MATERIALS

A. 10 mil polyethelyn moisture barrier.

B. As specified by other sections of this Project Manual.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and areas where tile will be installed, with Installer present.

B. Do not proceed with installation until piping, waterproofing, and other in-wall work has been installed and accepted by Architect/Engineer and unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Before installation, cut tile backer boards to required sizes, make necessary cut-outs for penetrations, and grind or drill to provide relief at bolts and screw heads which project beyond face of substrate.

3.03 INSTALLATION, GENERAL

A. Install cementitious backer units OVER MINIMUM 10 mil polyethylene moisture barrier and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

B. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation", comply with TCA installation methods indicated.

C. Conform to construction requirements of tested assemblies used to demonstrate required sound attenuation and fire resistance.

D. Extend work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown.

E. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.

F. Control Joints: Do not install tile backer board continuously through building movement and control joints or where control joints are required in ceramic tile.

G. Expansion Joints shall be installed per Tile Council of America recommendations.

3.04 PARTITIONS AND CEILINGS

A. Framing: Install over framing type indicated on drawings. Install blocking to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other accessories and hardware.

B. At perimeter walls where 6" concrete curb does not occur, install 16 oz. Copper flashing to 6" above finish floor as indicated on the drawings. Seal ends and laps water tight. Set in roofing cement or other water tight sealant.

C. Gypsum Board Base Layer: Install base layer as specified in Division 9 Section "Gypsum Drywall" where indicated on the drawings for fire or sound wall assemblies with multiple layers.

D. Moisture Barrier: Install over studs (over gypsum board base layer where it occurs). Lap joints to shed water towards face of partition. Bottom edge shall overhang curb or flashing at base.

E. Apply tile backer boards to framing with long dimension across framing. Fit ends and edges closely but not forced together. Center end or edge joints on framing and stagger joints in adjacent rows.

F. Fasten tile backer board to framing. Locate screws at least 3/8 inch from edge of board in accordance with manufacturer's recommendations and as follows:
Walls - Wood Framing: 8 inches o.c. maximum
Walls - Steel Framing 20 to 14-Gage: 8 inches o.c. maximum
Ceiling: 6 inches o.c. maximum

3.05 JOINT TREATMENT

A. Tiled Surfaces: Apply joint reinforcing over joints and corners. Embed with mortar or adhesive used to set tile.

B. Stop backer board 1/2" to 1" short of edge of tile to allow for the installation of gypsum board on remainder of wall. Ensure that solid blocking occurs at transition.

3.06 CLEANING AND PROTECTION

A. Cleaning: Upon completion of placement and joint treatment of backer boards, clean all surfaces so they are free of foreign matter, irregularities, protrusions, gaps, etc, that may interfere with application of finish materials.

B. Finished Work: Leave installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective work.

END OF SECTION

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SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Interior gypsum board for walls and ceilings.

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Carpentry" for wood framing and furring that supports gypsum board.
   2. Division 07 Section "Building Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.
   3. Division 09 Section "Tile Backer Board" for cementitious backer units installed as substrates for ceramic tile.
   4. Division 09 painting Sections for primers applied to gypsum board surfaces.
   5. Division 09 Section "Gypsum Board Suspension System" for gypsum board support system at ceilings and soffits where indicated.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch long lengths for each trim accessory indicated.
   2. Textured Finishes: 24 inch square size for each textured finish indicated and on same backing indicated for Work.

1.03 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.04 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and environmental conditions are acceptable.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.01 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.02 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. American Gypsum Co.
      b. BPB America Inc.
      c. G-P Gypsum.
      d. National Gypsum Company.
      e. Temple.
      f. USG Corporation.

B. Regular Type (Type "X" Fire Rated):
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

C. Type F. R. (Type C Fire Rated and impact resistant):
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

D. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board. Use Type C (Fire Rated where required for fire assemblies):
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

E. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
   1. Core: 5/8 inch, Type F.R.
   2. Long Edges: Tapered.

F. Very Hi-Impact Wallboard: reinforced fiber mesh for increased indentation and penetration resistance, ASTM 636 ASTM C1278, Type X, 5/8" thick, tapered edges, ends cut square. Provide at walls indicated for Acrovyn or FRP wall panels and at corridor walls and similar high traffic areas.

G. Other types and thicknesses specifically indicated or otherwise required to achieve fire-rated and sound rated wall and ceiling assemblies.

2.03 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      f. Expansion (control) joint.
      g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.04 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
   1. Interior Gypsum Wallboard: Reinforced Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
   3. Fill Coat: For second coat, use drying-type, all-purpose compound.
   4. Finish Coat: For third coat, use setting-type, sandable-type sandable topping compound.
   5. Skim Coat: When a level 5 finish is required, for the final coat use setting-type, sandable topping compound.

2.05 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Gypsum Board Adhesive:
   1. DAP Professional Drywall Construction Adhesive.
   2. Liquid Nails Drywall Adhesive.

D. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

E. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."

F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

G. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

2.06 TEXTURE FINISHES

A. Finish: As recommended by textured finish manufacturer.
   1. Texture Finish: Water-based, job- mixed, drying-type texture finish for spray application.
      a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
         1) G-P Gypsum; Georgia-Pacific ToughRock Wall and Ceiling Texture.
         2) USG Corporation; Sheetrock Quick Spray Decorative Texture.

2. Texture: Smooth sand finish.
3. Architect to approve samples for desired texture (typically fully smooth troweled) prior to application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance. Verify that all blocking, backing, strapping and framed openings as required for attachment of accessories, equipment, fixtures and cabinetry has been properly installed.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing full height with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally. Fully encapsulate interior side of insulated walls with gypsum board panels.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
4. At fire-resistive wall and ceiling assemblies, install gypsum board panels cut tight to and around rafters, joints, blocking, beams and similar projections to provide full membrane protection to roof or floor deck above and/or to rated membrane applied to underside of roof/floor framing to achieve the fire protection required by referenced CBC UL or W-H assemblies and as indicated in drawings. Seal voids with fire resistant sealant. Refer to Sections 07 84 10 and 07 84 43 for firestop requirements.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood or metal framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

3.03 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
1. Regular Type: Vertical surfaces, unless otherwise indicated.

2. Type F.R.: Where required for fire-resistance-rated assembly Vertical surfaces, unless otherwise indicated.
3. Ceiling Type: Ceiling surfaces.
4. Moisture- and Mold-Resistant Type: At wet areas in restrooms and sink areas.

B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
2. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.04 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 84 in specific locations approved by Architect for visual effect and as indicated on the drawings.

C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use at exposed panel edges. Leave 1/4" space for caulk where abutting dissimilar materials such as door and window frames.

3.05 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
   1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
   2. Level 2: Panels that are substrate for acoustical tile and vinyl covered tackboard.
   3. Level 3: Where indicated on the drawings.
   4. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
      a. Primer and its application to surfaces are specified in other Division 09 Sections.
   5. Level 5: Where wall coverings are specified or where indicated for a very smooth/level finish.
      a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.06 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.07 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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SECTION 09 30 00

TILING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Ceramic tile flooring, base and wainscot as indicated.
   2. Crack isolation membrane.
   3. Waterproof membrane for mortar bed tile installation and at shower pans.

B. Related Sections:
   1. Division 03 Section "Cast-in-Place Concrete" for depressed slabs and concrete curbs.
   2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
   3. Division 09 Section "Tile Backer Board" for ceramic tile substrate.

1.02 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.03 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
   1. Level Surfaces: Minimum 0.06.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

C. Samples for Verification:
   1. Full-size units of each type and composition of tile and for each color and finish required.
   2. Full-size units of each type of trim and accessory for each color and finish required.

1.05 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
   1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
   1. Crack isolation membrane.
   2. Joint sealants.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.01 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
   1. As selected by Architect from manufacturer's full range in price groups through 4.
   2. Provide sizes indicated in drawings and all required trim shapes needed for a complete installation.

D. Factory Blending: For tile exhibiting color variations within ranges, selected during sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.02 TILE PRODUCTS

A. Provide the following pre-selected tile products:

MATERIAL LEGEND - FLOOR

SYMBOL	MATERIAL	MFG.	STYLE	COLOR	GENERAL DESCRIPTION
F-1	24x12 Tile	Daltile	Volume 1.0	Intensity Pebble VL72	Main Floor (Field)
F-1a	1x1 Mosaic Tile	Daltile	Keystones	Desert Gray	Shower
F-1b	24x12 Tile	Daltile	Skybridge	SY98 Gray	Bathroom, Vanity Area

MATERIAL LEGEND - BASE

B-1	4x12 Tile	Daltile	Volume 1.0	Intensity Pebble VL72	Kitchen, Laundry, Unisex Bathroom Vanity Cut from 12" x 12" tiles
B-1a	4 1/4 x12	Daltile	Modern Dimensions Bullnose	Matte Architectural Gray 0709(2)	Bedroom area Toilet Rooms Cut 4-1/4X 12-3/4 to 12" lengths

MATERIAL – TILE WALLS / WAINSCOT / BACKSPLASH

W-1	4x12	Daltile	Modern Dimensions	Desert Gray	Install vertical @Shower & horizontal @ Kitchen Backsplash

2.03 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fluid-Applied Membrane: Elastomeric urethane polymer or liquid-latex rubber.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Bostik; MVP4 Moisture vapor protection membrane for wood floors.
      b. Custom Building Products; Redgard waterproofing and crack prevention membrane.
      c. Hydroment; Ultra-set Advanced waterproofing and crack Prevention membrane.
   2. Apply at shower floors walls, watertight to 12" minimum above floor,

2.04 SETTING MATERIALS

A. Available Manufacturers:
   1. Bostik, Inc.
   2. Custom Building Products.
   3. Hydroment Brand products.
   4. LATICRETE International Inc.

B. Portland Cement Mortar (Thickset) Installation Materials: ANSI A 108.1A and as specified below: Typical at showers.
   1. Cleavage Membrane: Asphalt felt, ASTM D 226. Type I (no. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
   2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

   3. Expanded metal lath: Diamond-mesh lath complying with ASTM C 847.
      a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized steel sheet, with uncoated steel sheet painted after fabrication into lath.
      b. Configuration over Studs and Furring: Flat.
      c. Configuration over Solid Surfaces: Self-furring.
      d. Weight: 3.4 lb/sq. yd.

   4. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part of all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed Portland cement and aggregate mortar bed.

C. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
   1. For wall applications, provide nonsagging mortar that complies with Paragraph C-4.6.1 in addition to the other requirements in ANSI A1181.1.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
   1. For floor application over smooth, level slab, provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
   2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.05 GROUT MATERIALS

A. Standard Cement Grout: ANSI A118.6.

B. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.
   1. Polymer Type: Either ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
      a. Unsanded grout mixture for joints 1/8 inch and narrower.

2.06 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
   1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. DAP Inc.; Titanium Enriched Kitchen and Bath Sealant.
      b. Dow Corning Corporation; Dow Corning 786.
      c. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
      d. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
      e. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
      f. Tremco Incorporated; Tremsil 600 White.

2.07 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
   1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
   2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Bonsal American; an Oldcastle company; Grout Sealer.
      b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
      c. C-Cure; Penetrating Sealer 978.
      d. Custom Building Products; Grout Sealer.
      e. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
      f. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
      g. TEC; a subsidiary of H. B. Fuller Company; TA-257 Silicone Grout Sealer.

2.08 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
   1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
   2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
      a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
      b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
   3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
   4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
   1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
   2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
   1. Remove protrusions, bumbs and ridges by sanding or grinding.

D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

E. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.03 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
   1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
      a. Tile floors in wet areas.

B. Extend tile work into recesses, knee space below counters and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
   1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
   2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

   3. Layout free ends of tile wainscots to the next full tile beyond dimensions indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   1. Ceramic Mosaic Tile: 1/16 inch.

2. Glazed Wall Tile: 1/16 inch.

F. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

G. Grout tile to comply with requirements of the following tile installation standards:
1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

H. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.04 TILE WALL PATCHING

A. Preparation: Remove damaged and loose tiles from wall. Replace removed, missing and damaged tiles with new tiles of size matching existing tiles.

3.05 WATERPROOFING AND CRACK ISOLATION MEMBRANE INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

B. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

C. Do not install tile or setting materials over waterproofing or crack isolation membrane until membrane has cured. Test waterproofing to determine that it is watertight by damming perimeter and openings and flood testing (1" minimum deep) for 2 hours minimum.

3.06 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installations standards.
1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
a. Tile floors in wet areas.

B. Joint Widths: Install tile on floors with the following joint widths:
   1. Ceramic Mosaic Tile: 1/16 inch.

C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.07 WALL TILE INSTALLATION

A. Install type of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on walls with the following joint widths:
   1. Ceramic Mosaic Tile: 1/16 inch.

3.08 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove latex-portland cement grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
   3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.09 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:
   1. Tile Installation F122: Thin-set bond coat on waterproof membrane;
      a. Finish Type: F-5 (when required to match existing conditions).
      b. Grout: Polymer-modified sanded grout.

c. Thin-Set Mortar: Latex- Portland cement mortar.
d. Waterproof membrane: Liquid applied.
e. Substrate: Concrete.

2. Tile Installation F112: Bond coat on waterproof membrane on mortar bed;
a. Finish Type: F-5 (when required to match existing conditions).
b. Grout: Polymer-modified sanded grout.
c. Thin-Set Mortar: Latex- Portland cement mortar.
d. Waterproof membrane: Liquid applied.
e. Mortar Bed: ANSI A108.1A.
f. Substrate: Concrete, existing and new.

B. Interior Wall Installations, Wood and Metal Studs or Furring:
1. Tile Installation W244C: Thin-set mortar on cementitious backer units or fiber cement underlayment.
a. Finish Type: W5 (when required to match existing conditions).
b. Grout: Polymer-modified unsanded grout.
c. Thin-Set Mortar: Latex- Portland cement mortar.
d. Moisture membrane:
e. Substrate: Framing/sheathing.

END OF SECTION

SECTION 09 54 26

LINEAR WOOD GRILLE CEILING SYSTEM

PART 1 - GENERAL

1.01 Description of Work

A. Work Included: Provide Wood Grille ceiling system where shown on drawings, and as specified in this section.

1.02 Quality Assurance

A. Linear wood grille ceiling 6350-C System for this project shall maintain the quality as instituted by the architect or A.W.I.

B. Design Criteria: Linear wood grille ceiling system shall be installed true and plumb to within manufacturing tolerance of 1/8" within 8' of length.

C. Product Construction: Wood shall be kiln dried to 10%. Cracking, checking and warpage of members will not be acceptable.

1.03 Submittals – Comply with Section 01 33 23 Submittal Procedures

A. Technical Data: Submit manufacturer's data and installation instructions.

B. Shop Drawings: Submit of shop drawings showing all areas involved, attachment conditions and perimeter termination.

C. Submittal Sample: Submit product samples for approval by architect.

1.4 Delivery, Storage and Handling – Comply with Section 01 61 00 product Requirements

A. Material must be stored and installed only in secured ambient environment (humidity min. 25% - max. 55%, temperature not to exceed 86 degrees).

B. Windows, doors and all wet-work must be completed before unpacking and installation. Handle carefully to avoid damage.

PART 2 - PRODUCTS

2.01 Acceptable Manufacturer

ARCHITECTURAL COMPONENTS GROUP, INC. 521 George St. Marshfield, MO 65706
Phone (417) 869-6777 Fax (417) 869-7888

2.02 Product Type

A. Product Configuration: Wood Grille Backer system product: GB1-6350-C
Nomenclature for product GB1-6350-C:
GB1 = Grille Backer Series 1
6 = number of blades per foot

350 = 3 ½" deep
C = ¾" thick blades

B. Solid wood Grille members shall be provided in fixed panel lengths of 2' up to 10' [in 1' increments]. If wood veneer, Grille members shall be provided in fixed panel lengths of 8' or 10' lengths, or as required for project. Grille panels shall be 1' and/or 2' wide.

C. Wood Grille assembly: Factory-assembled with white backers at 12" on center.

D. Finish: Wood finish shall utilize ACGI clear finish with satin sheen to match approved sample. Back of planks shall be factory sealed.

E. Wood specie shall be poplar, solid wood.
NOTE: Veneered blades shall have matching edge banding on one long edge.

F. Fire Rating: Grilles shall achieve a *Class I(A) or Class III(C)* fire rating.

G. Attachment System: Grille Backer Ceiling System shall be suspended according to manufacturers suggested method of suspension and in accordance with the drawings.

PART 3 - EXECUTION

3.01 Installation

A. Wood Grille Backer ceiling system shall be handled and installed with care in order to prevent surface and structure damage. Field cutting shall be kept to a minimum and performed as recommended by manufacturer.

B. The ceiling system shall be suspended by HD T-grid with main runners on 2' centers and cross T's every 4'.

C. Contractor shall clean all panels prior to installation according to manufacturer's recommended maintenance procedures. Upon completion of installation, panels shall be inspected and cleaned as needed.

PART 4 - WARRANTY

4.01 Product Warranty

A. ARCHITECTURAL COMPONENTS GROUP, INC. shall warranty the wood Grille Backer ceiling system against manufacturer's defects up to two years. Changes in finish or dimensions due to ultra violet light, excessive temperature or humidity conditions and/or abuse of any kind shall void any warranties from ACGI.

B. Install conditions for the area should remain for the proper occupied conditions of humidity and temperature (humidity min. 25% - max. 55%, temperature not to exceed 86 degrees).

C. The contractor shall warranty for one year all work from final acceptance of completed work.

END OF SECTION

SECTION 09 68 16

BROADLOOM CARPET

PART 1 - GENERAL

1.01 SECTION INCLUDES: Carpet and installation requirements as follows:

A. Manufacturers
B. Testing Protocols
C. Performance Requirements
D. Product Specifications
E. Environmental Requirements
F. Warranties
G. Exclusions
H. Installation
I. Maintenance
J. Accessories

1.02 REFERENCES

American Association of Textile Chemists and Colorists (AATCC):

- AATCC 16, Test Method of Colorfastness to Light.
- AATCC 107, Test Method for Colorfastness to Water.
- AATCC 129, Test Method for Colorfastness to Ozone in the Atmosphere Under High Humidity.
- AATCC 134, Test Method for Electrostatic Propensity of Carpets.
- AATCC 165-(93), Test Method for Colorfastness to Crocking: Carpets – AATCC Crock meter Method.
- AATCC 175-(98), Test Method for Stain Resistance: Pile Floor Coverings
- AATCC 189, Test Method for Fluorine Content of Carpet Fibers
- AATCC 164, Test Method for Colorfastness to Oxides of Nitrogen in the atmosphere under High Humidities.

American Society for Testing and Materials (ASTM):

- ASTM D418-(12), Methods for Testing Pile Yarn Floor Covering Construction (Finished Pile thickness Only)
- ASTM D5848, Standard Test Method for Mass Per Unity of Pile Yarn for Floor Covering.
- ASTM D5823, Standard Test Method for Tuft Height of Pile Floor Coverings
- ASTM D5793, Standard Test Method for Binding Sites Per Unity Length or Width of Pile Yarn Floor Coverings.
- ASTM D1335 – Standard Test Method for tuft Bind of Pile Yarn Floor Covering.

- ASTM E648- Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- ASTM E662 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- ASTM D3676, Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay (covers thickness, Compression Resistance, Volume, Density, Compression Set, and Accelerated Aging).
- ASTM D3574, Standard Test Methods for Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams.
- ASTM D3936, Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.

International Standards Organization (ISO):

- ISO 2551, Test Method for Dimensional Stability (Aachen test)

Supplemental Testing Procedures:

- PT-155-Rev. 86, Loop Pile Run Resistance test

Carpet and Rug Institute (CRI):

- CRI Indoor Air Quality Testing and Labeling Program

U.S. Department of Housing and Urban Development (HUD):

- HUD UM 44D-(93), HUD Building Product Standards and Certification Program for Carpet.

1.03 PERFORMANCE REQUIREMENTS

Comply with the following performance requirements:

- Radiant Panel: ASTM E648: <.45 watts/sq. cm: Class 1
- Smoke Density: ASTM E662: 450 Flaming Mode - Maximum
- Static Generation: AATCC 134: 3.5 KV - Maximum
- Lightfastness: AATCC 16E: Min 4.0 at 40 hrs.
- Crocking: AATCC 165: 4.0 – Wet/Dry
- Cold Water Bleed: AATCC 107: 3.0 - Minimum
- Ozone Fade: AATCC 129: 3.0 - Minimum
- Soil Protection: AATCC 189: 500 PPM Min.
- CRI Green Label Plus Air Quality Certification: Pass
- Stain Protection: AATCC 175: Equal to or greater than 8.0 on Red 40 stain test
- CRI Appearance Retention Rating 3.0 minimum – Heavy Traffic
  3.5 minimum – Severe Traffic

Special Performance Requirements:

- Must contain soil protection
- Must have permanent anti-stat fiber.
- Must have Trilobal cross-section
- Must be at least 18 dpf fiber
- Must be type 6,6 continuous filament nylon

1.04 SUBMITTALS

- Manufacturer's Data
  Submit two (2) copies of manufacturer's specifications and installation instructions for Broadloom carpet and related items specified.

- Fiber Requirements
  Submit certification from the fiber producer verifying the following:

  - Use of the specified fiber in the submitted carpet product.

- Warranties
  Submit warranties as described in Section 1.13

- Maintenance
  - Maintenance Manual – submit manual of carpet manufacturer's recommendations for the general care, cleaning and maintenance of carpet products.

- Certificate of Compliance
  Submit certified test reports that carpet meets all the performance requirements stated above in section 1.3 Performance requirements. Submit certified test reports from a NVLAP Certified Lab that carpet meets all performance criteria.

- Shop Drawings
  For carpeted areas submit shop drawings showing installation of carpeting, pattern direction, necessary installation accessories, and provisions for work of other trades. Show location of different patterns or styles of carpet. Also show locations of any threshold conditions

  - The contractor will supply reproducible prints on request, to facilitate shop drawing preparation.

- Samples
  Submit standard-size carpet samples of each type of carpet, in each specified pattern, color and construction.

  Any alternates to specified products must be submitted for approval by a representative of the end user or architect/design firm at least ten (10) working days prior to bid or proposal.

- Final Sample Submittal
  Submit two (2) sets of samples for each carpet type.

- No carpet shipments are permitted until acceptance of final samples is given by representative of the end user or architect/design firm, certifying that samples are the approved color, pattern and texture.

- Custom Color only
  A representative of the end user or architect/design firm, certifying that the samples are the approved color, pattern and texture, shall sign high quality color samples.

- Samples submitted are assumed to be the manufacturer's best obtainable match to the color described under Materials Section.

1.05 CLOSEOUT SUBMITTALS

- Maintenance Data
  Include maintenance procedures, recommended cleaning and stain removal materials, and recommended cleaning schedule. Include product data and Material Safety data Sheets (MSDS) for cleaning and stain-removal materials.

- Installation Instructions
  Include detailed installation procedures. Include carpet installation procedures, adhesive types, trowel sizes, spread rates, open times, and Material Safety data sheets (MSDS) for all carpet adhesives.

- Warranties and Performance Certifications
  Submit written warranties for all products as well as Performance testing results on all items included in Warranty section (including all testing results mandated by EverSet warranty on EverSet products) and Performance section of this specification.

1.06 QUALITY ASSURANCE

- Single Source Responsibility: Provide products from a single manufacturer.

  - Warranties must be standard and not job specific.
  - All styles must come from the same manufacturer.

1.07 QUALIFICATIONS

- Manufacturer
  Company specializing in manufacturing commercial carpet with minimum five (5) years (documented) experience.

- Installer/Flooring Contractor Qualifications

    - Carpet contractor must provide all the necessary licenses, performance bonds, and insurance certificates that comply with all local, state, and federal laws, ordinances, or codes prior to the start of the installation.

    - Carpet contractor shall be a firm established not less than five (5) years and, if requested, shall submit evidence of having furnished and installed commercial carpet projects of similar size and scope for at least give (5) years.

    - Flooring Contractor to provide references at the request of the owner.

    - Carpet Contractors must also be mill certified for installing products.

    - Carpet Contractor will be responsible for the proper product installation, including floor preparation, in those areas indicated in the Drawings.

    - Carpet Contractor to provide owner a written warranty that guarantees the completed installation be free from defects in materials and workmanship for a period of two (2) years after job completion.

1.08 PRE-INSTALLATION MEETINGS

- Convene one (1) week prior to commencing work of this section.

- Require attendance of (manufacturer), (installer), (contractor), (owner), (architect) and other parties directly affecting the work of this section.

1.09 DELIVERY, STORAGE AND HANDLING

- Deliver carpet in sealed protective rolls and accessories in sealed containers. Segregate each product (if several product styles are involved), according to style, color, pattern, dye lot, run number, and quantity.

- Store products in an enclosed and dry area protected from damage and soiling.

1.10 SITE ENVIRONMENTAL REQUIREMENTS

- Do not install carpet until areas have been fully enclosed and environmental conditions have reached the levels indicated during occupancy.

- Maintain ambient temperature and humidity conditions during and after installation of carpet at levels indicated during occupancy.

- Allow carpet to reach room temperature or minimum temperature recommended by manufacturer before beginning installation.

- Protect adhesives from freezing. Follow manufacturer's recommendations for minimum temperatures to which adhesives are exposed.

1.11 FIELD MEASUREMENTS

- Verify that field measurements are as indicated on drawings.

1.12 SEQUENCING

- Sequence installation so as to minimize possibility of damage and soiling of carpet.

- Do not commence installation until painting and finishing work are complete, and ceiling and overhead work have been tested, approved and completed.

- Remove and replace existing carpet (renovations) in accordance with pre-approved architectural plan.

1.13 WARRANTY

Warranty Performance Requirements:

- Warranties must be for Lifetime on all items.
- Lifetime warranties must cover face components and backing components
- Warranties must be non-prorated
- Carpet manufacturer must warrant both product and adhesive systems.
    - Fiber must have lifetime static warranty.

- Warranty – include coverage for:

    - Provide carpet installer's warranty against defects in installation.

- Provide full spectrum of Manufacturer's Lifetime warranties as outlined below:
  - Wear

1.14 EXTRA MATERIALS

- Provide percent overage of calculated yardage for each type of carpet (include carpet needed for complete installation plus waste and usable scraps in calculated yardage) as specified by architect and/or end user. Recycle waste, unusable scrap and any carpet damaged during installation through manufacturer's environmental program.

- Elevator carpet: Provide extra stock for two (2) complete carpet changes for each elevator cab.

- Deliver specified attic stock to Owner's designated amounts and to designated storage space, properly packaged and identified. Redirect small pieces of waste to be appropriately recycled.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- The Mohawk Group, 160 S. Industrial Blvd, Calhoun GA 30701 Telephone 800.241.4494. Web Site: www.mohawkgroup.com
- Contact: Allen Moran – Cell: 559.307.1613

- Substitutions or Equals:

  - Substitutions are allowed only if they meet the following criteria:
    - Acceptance of alternate product(s) that are accepted as equals must be approved by parties (including, but not limited to) parties that have material interest in the specifications including: Designer, Architect, End-User and Flooring Contractor.

2.02 CARPET CONSTRUCTION

- All yarn and other carpet materials shall be manufacturer's first quality.

DETAILED PRODUCT CONSTRUCTION SPECIFICATIONS

Style Name:	Cross Knit
Product Type:	Broadloom
Construction:	Tufted
Surface Texture:	Textured Patterned Loop
Gauge:	1/12 (47.00 rows per 10 cm)
Density:	7385

Weight Density:	118,160
Stitches per Inch:	12.0 (47.24 per 10 cm)
Finished Pile Thickness:	.078" (1.98 per 10 cm)
Dye Method:	Solution Dyed
Backing Material:	Unibond® Plus
Fiber Type:	Colorstrand® Nylon
Face Weight:	16.0 Oz. per sq. yd. (542 g/m2)
Pattern Repeat:	18" (W) x 36" (L)
Soil Release Technology:	Sentry Plus
Width:	12' (3.66m)
Indoor Air Quality:	Green Label Plus 3802
Foot Traffic Recommendation TARR:	Heavy

All specifications are subject to normal manufacturing tolerances

2.03 ENVIRONMENTAL ATTRIBUTES AND CRITERIA

- Environmental claims by manufacturer must comply with FTC guidelines.

- Low Emitting Materials – Broadloom Carpet. Carpet must pass the Carpet and Rug Institute Green Label Plus Program for VOC emissions.

- Low Emitting Materials: Carpet and all installation components including adhesives, sealers, seam welds and seam sealers must meet the *Lowe Emitting Materials* standards as outlined in U.S. Green Building Council LEED criteria. Adhesives must meet VOC emissions standards per South Coast Air Quality Management District Rule #1168.

- Installation adhesives must pass the CRI Green Label plus equivalent protocol for VOC emissions.

- End of Life Reclamation – Carpet manufacturers must have existing program in place to achieve landfill diversion. Refer to Section 3.7 of this section for specific requirements for reclamation of material. ReCover – Carpet recycling program, call toll free 877-373-2925.

2.04 ACCESSORIES

- Leveling Compound: Latex type as recommended by carpet manufacturer; compatible with carpet adhesive and curling/sealing compound used on concrete.

- Multipurpose Adhesive: Low VOC NuBroadlok™ premium multipurpose adhesive or NuSprayLok™ adhesive, as recommended by carpet manufacturer for direct glue down of carpeting; comply with CRI Green Label Certification Program.

- Non-Metallic Carpet edge Guard: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated; minimum two (2) inch wide anchorage flange; colors selected by (Architect) (Designer) from manufacturer's standard range of colors.

- Miscellaneous Materials: As recommended by manufacturer of carpet, cushion, and other carpet products; as required to complete installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- Examine substrates for conditions under which carpeting is to be installed.

- Verify that floor surfaces are smooth and flat within tolerances specified in Section 3.2 and are ready to receive work.

- Beginning of installation means installer accepts existing substrate conditions.

3.02 PREPARATION

- Allow new concrete to cure for 90 days before carpet installation starts.

- Perform moisture content testing as required by manufacturer's instructions to ensure pH readings of no more than nine (9). Moisture transmission of 5.0-lbs/sq. ft per 24 hours is acceptable. If values exceed this level, follow manufacturer's recommendations for moisture transmission mitigation. Do not proceed until unsatisfactory conditions have been corrected.

- Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes and other defects with sub-floor filler.

- Fill, level and make smooth cracks 1/16 inch or more, holes, unevenness, and roughness with compatible latex floor patching compounds. Feather floor filling or leveling compound a minimum of four (4) ft. Sweep floor of loose granular debris prior to filling. After filling, allow filler to dry. Damp mop floor with warm water and allow to dry. Vacuum after mopping to ensure that loose granular debris is removed and to provide a proper substrate to install Broadloom carpet. Prohibit traffic until filler is cured.

- Vacuum floor again immediately before installation of carpeting.

- Confirm compatibility of NuBroadlok™ premium multipurpose adhesive with curing compounds on concrete floors.

- Preheat areas to receive carpet to a minimum temperature of 68° F for 72 hours prior to installation, with a relative humidity of not more than 65 percent. Maintain minimum temperature of 50° F thereafter. Carpet and adhesive must be stored at a minimum temperature of 68° F, for 72 hours prior to installation.

- Store NuBroadlok™ premium multi purpose adhesive and other liquid materials in same atmospheric conditions as carpet, 68° F for at least 72 hours.

3.03 INSTALLATION

- Install carpet in accordance with the Technical Bulletins provided by the manufacturer for tufted and/or woven products. These technical bulletins will offer the proper instructions to install carpet including: (1) Conducting Site Testing and conditioning, (2) Floor Preparation, (3) Installation of the carpet, including layout (seaming, carpet layout and cutting, power stretching, approved adhesives systems and seam sealers, etc.) As a supplement, the CRI 104, section 8 will supply additional installation support guidance for your installation.

- Adhesives and Sealers: Carpet adhesives and sealers include, but may not be limited to, Nu Broadlok™ premium multipurpose adhesive, Nu Broadlok™ Latex Carpet Edge Sealers, and Nu Broadlok™ Solvent Free Carpet Seam Sealer.

- Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets in each space.

- Provide cut outs where required. Conceal cut edges with protective edge guards or flanges.

- Install carpet under open-bottom items and install tight against walls, columns, and cabinets so that the entire floor area is covered with carpet. Cover over floor-type door closers.

- Install edging guards at openings and doors wherever carpet terminates, unless indicated otherwise.

- Perform cutting in accordance with manufacturer's recommendation using tools designed for carpet being installed. Verify carpet match before cutting to insure minimal variation between dye lots.

- Install carpet from same dye lot and run within each continuous carpet area.

- Seal seams with manufacturer recommended seam sealer, if applicable.

- Install carpet with pile-lay in same direction except when indicated otherwise on drawings.

- Use leveling compound where necessary. Feather floor leveling compounds minimum of 4 ft.

- Do not bridge building expansion joints with continuous carpeting. Provide for movement.

- Apply seam adhesive to base of edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

- Roll with appropriate roller for complete contact of adhesive to carpet backing.

- Trim carpet neatly at walls, and around interruptions

OR

- Extend carpet at base finish up vertical surface to form base. Terminate top of base with cap strip.

- Complete installation of edge strips, concealing exposed edges.

- Cut carpet at fixtures, architectural elements, and perimeters.

- Use a fixed reducer trip to secure broadloom area in open perimeter designs.

- Install carpet on stairs using acceptable permanent adhesive. Furnish and use compatible edge strip and nosing products as required.

3.04 FIELD QUALITY CONTROL

- Inspect completed carpet installation on each floor

- Verify that installation is complete; work is properly done and acceptable

- Remove and replace, at no additional cost to owner, any work found not to be acceptable.

3.05 CLEANING

- On completion of installation in each area, remove dirt and scraps from surface of finished carpet. Clean soiling, spots, or excess adhesive on carpet with cleaning materials recommended by carpet manufacturer.

- Remove debris; sort pieces from carpet scraps

- At completion of work, vacuum carpet using commercial vacuuming equipment as recommended by manufacturer. Remove spots and replace carpet where spots cannot be removed. Remove rejected carpet pieces and replace with new carpeting. Remove any protruding yarns with shears or sharp scissors.

3.06 PROTECTION

- Do not permit traffic over unprotected carpet surface.

- Protect carpet against damage during construction. Cover with 6-mil thick polyethylene covering joints during construction period whenever protection is required so that carpet will be without soiling, deterioration, wear, or damage at time of completion.

- Damaged carpet will be rejected. As carpet is installed, remove trimmings, scraps of carpet and installation materials.

- Maintain protection of carpeting on each floor or area until work is accepted.

3.07 CARPET RECLAMATION – BROADLOOM CARPETING AND CARPET TILE

This specification is for carpet reclamation and is designed to manage carpet recycling for any type of used carpet or carpet pad.

- CARPET REMOVAL – BROADLOOM
  - Remove used carpet in carpet pieces, roll tightly, and pack neatly in container. (Include carpet scrap and waste from new installation.) Immediately remove used carpet from Site. For reclamation projects coordinated by Mohawk Reclamation Department, place in Mohawk provided covered containers.
  - Deposit only clean, dry used carpets in containers. Clean shall be defined as carpet free from demotion debris or asbestos contamination, garbage, and tack strips.

- CARPET REMOVAL – CARPET TILE
  - Remove used carpet tile and stack neatly on pallets. Neatly stack carpet tiles or repack in cardboard boxes prior to placing in container. Do not stack higher than 6 feet on pallets. (Include carpet scrap and waste from new installation.) Immediately remove used carpet from Site. For reclamation projects coordinated by Mohawk Reclamation Department, place in Mohawk provided covered containers.
  - Deposit only clean, dry used carpets in containers. Clean shall be defined as carpet free from demotion debris or asbestos contamination, garbage, and tack strips.

- CONTAINER HANDLING
  - Place used carpet in container supplied by Mohawk Reclamation Department. Containers are fully enclosed and shall be kept locked or supervised.
  - Broadloom carpet must be segregated in separate containers from tile carpeting.
  - Use effective packing techniques to maximize the amount of material in the container. On average the following amounts are the related container capacities.

Container Size	Broadloom Capacity	Tile Capacity
53' Foot	4,800	3,500

- CONTAINER REMOVAL
  When container is full, contact Mohawk Reclamation Department to coordinate pickup and drop-off of replacement container if needed. If container is locked for security purposes, remove the lock prior to pick up.

  The Mohawk Reclamation Department toll free number is (877) 3RE-CYCL or (877) 373-2925

- RECLAMATION CERTIFICATE
  The Mohawk Reclamation Department will issue a reclamation certificate once used carpet is removed from the job site and or dealer location and delivered to reclamation facility.

END OF SECTION

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SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces, as indicated on the drawings and schedules, and as specified herein.
   1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
   2. Paint and finish exposed surfaces using the combination of materials listed on Painting Schedule in part 3 of this Section, as specified herein, and as needed for a complete and proper installation.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
   1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish except when specifically noted otherwise.
   2. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections. Said provisions DO NOT negate the primers required to be applied on-site where finishing is a part of this Section.

C. Provide labor, materials, equipment, and services needed to clean and prepare the surfaces, and to paint including, but not necessarily limited to:
   1. Interiors requiring painting of surfaces including gyp. board walls/ceilings, wood casework, trim, window panels/frames/sash, doors/frames and other similar items in the areas of work.
   2. Exterior:
      a. Plaster building walls soffits, and misc. trim, including flashing that is not prefinished. Paint all cement plaster walls, even where plaster color finish coat is indicated.
      b. Trim, window panels/frames/sash, doors/frames and other similar items in the area of work.
      c. Special finish for Entry doors No. 1: Sand, prep and refinish exterior face of prefinished maple veneer door with accent color stain and high glass clear coat.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and required labels.
   1. Prefinished items include (but not necessarily limited to) the following factory-finished components:
      a. Architectural woodwork.
      b. Prefinished Wood Doors (except main entry door).
      c. Acoustical wall panels.
      d. Metal lockers.
      e. Finished mechanical and electrical equipment.
      f. Light fixtures.
   2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
      a. Furred areas.
      b. Ceiling plenums.
      c. Utility tunnels.
      d. Pipe spaces.
      e. Duct shafts.
   3. Finished metal surfaces include (but not necessarily limited to) the following:
      a. Anodized aluminum.
      b. Stainless steel and galvalume roofing.
      c. Chromium plate.
      d. Copper and copper alloys.
      e. Bronze and brass.
   4. Operating parts include moving parts of operating equipment and the following:
      a. Valve and damper operators.
      b. Linkages.
      c. Sensing devices.
      d. Motor and fan shafts.
   5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
   6. Sandblasted concrete: Do not paint unless so scheduled.

E. Related Sections include the following:
   1. Division I Section “Product Requirements”.
   2. Division 5 Section "Structural Steel" for shop priming structural steel.
   3. Division 5 Section "Metal Fabrications" for shop priming ferrous metal.
   4. Division 6 Section "Interior Architectural Woodwork" for shop priming and finishing of interior architectural woodwork.
   5. Division 7 Section “Joint Sealants”.
   6. Division 8 Section "Hollow Metal Doors, Windows and Frames" for factory priming steel doors and frames.
   7. Division 9 Section "Gypsum Board" for surface preparation of gypsum board.

F. The Finish Schedules and descriptive notes indicated on the drawings, indicates the location of interior room surfaces to be painted or finished. The Schedule indications are general and do not necessarily define the detail requirements. Include all detailed refinements and further instructions as may be given for the required complete finishing of all spaces and rooms. Interior Elevations, building Sections and Details, Room Finish Schedules and Color Schedules are all to be used in concert to determine requirements of this Section.

1.02 DEFINITIONS

A. General: "Paint," as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, stains, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats. Standard coating terms defined in ASTM D 16 apply to this Section.
   1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
   2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
   3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
   4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.03 SUBMITTALS

A. Product Data: Within 25 calendar days after the Contractor has received the Owner's Notice to proceed, submit, for each paint system indicated, (include block fillers and primers) the following:
   1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application specific to the project for surfaces to receive each product. Identify each material by manufacturer's catalog number and general classification.
   2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material. Data proving compliance with the specified requirements and regulations shall be submitted for inclusion with warranty and certification information to be retained by the Owner.

B. Samples
   1. Following the selection of colors and glosses by the Architect, submit Samples for the Architect's review. If selection of colors/glosses has been scheduled, commence immediately with the sample submittal.
      a. Provide five Samples of each color and each gloss for each material on which the finish is specified to be applied. Submittals will be reviewed for color and texture/finish only. Provide a listing of material and application for each coat of each finish sample.

b. Except as otherwise directed by the Architect, make Samples approximately 8" x 10" in size on materials simulating actual finished conditions.
c. On actual wood surfaces, provide 4" x 8" samples of natural and stained wood finish. Label and identify each as to location and application.
d. If so directed by the Architect, submit Samples during progress of the Work in the form of actual application of the approved materials on actual surfaces to be painted. Provide full-coat finish samples on at least 100 sq. ft. of surface as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

2. Revise and resubmit each Sample as requested until the required gloss, color, and texture is achieved. Such Samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
3. Do not commence finish painting until approved Samples are on file at the job site.

C. Qualification Data: For Applicator.

1.04 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
B. Paint coordination:
1. Provide finish coats which are compatible with the prime coats actually used. Provide priming, undercoating, coating and finishing products produced by a single manufacturer source. Use only thinners approved by the paint manufacturers, and use only within recommended limits. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.
2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
4. Provide barrier coats over noncompatible primers, or remove the primer and reprime as required.
5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime-coatings supplied under other Sections.

C. Intent of the drawings is to have a completed product. Where work of the Contract disturbs existing finishes such that repair is required, said repair work is to be accomplished to logical architectural stopping points.

D. Protect finished work from damage by other trades, workers and processes until work is turned over to the Owner. Provide temporary protective barriers and coverings when necessary.

E. Protect other work/surfaces from damage, drips or overspray by using appropriate shields, tarps, masks, etc. Clean any errant paint from adjacent materials as required and in accordance with appropriate cleaning methods for both the paint and for the materials being cleaned.

F. Regulatory Requirements:
1. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions.
2. Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to job going out to bid and before start of painting project.
3. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).

G. Quality verification requirements: These specifications call for a per-coat dry film thickness. The Contractor shall have available upon 48 hours notice a spectrographic measuring device (or other appropriate device) able to measure total thickness should there be a question as to the number of coats or compliance with the overall film thickness requirements.

H. Source Limitations: Obtain primers for each coating system from the same manufacturer as the finish coats.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.06 PROJECT CONDITIONS

A. IF APPLICABLE: Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45° F, unless otherwise permitted by the manufacturer's printed instructions.

B. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F, unless otherwise permitted by the manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces, unless otherwise permitted by the manufacturer's printed instructions.
   1. Painting may continue during inclement weather only if surfaces and areas to be painted are enclosed and heated (or cooled) within temperature limits specified by manufacturer during application and drying periods.
   2. Applications may also continue during inclement weather only within the temperature and humidity limits specified by the paint manufacturer as being suitable for use during application and drying periods.

D. Avoid painting surfaces when exposed to direct sunlight.

1.07 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents and location where used. Deliver extra materials to Owner.
   1. Quantity: Furnish Owner with an additional 4 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color and gloss applied.

PART 2 – PRODUCTS

2.01 PAINT MANUFACTURERS

A. Acceptable manufacturers:
   1. Subject to compliance with requirements, the following is a list of manufacturers offering products which may be incorporated in the work. Other manufacturers approved in advance by the Architect, may be substituted in accordance with provisions of the Contract. Various manufacturers have been listed in the Paint Schedule at the end of this Section to establish and identify paint systems for the numerous finishes and substrates to establish cross references. Subject to comparison with the listings shown on the Paint Schedule, products of the following manufacturers may be used in lieu of those shown. Submit the manufacturer's equivalent painting system for

each substrate and for each different finish for review by the Architect that is of equal or greater quality of performance and appearances as acceptable to Architect. Replace products listed with the latest equivalent paint, products, available from the manufacturers that have been updated for compliance with environmental regulations or for improved performance.

2. Approved Manufacturers: Subject to compliance with the requirements, manufacturers which offer products that may be used in the Work include, but are not limited to the following:
   a. Frazee
   b. Dunn Edwards Corporation
   c. I.C.I. Glidden Pro
   d. The Sherwin-Williams Company
   e. Kelly-Moore
   f. Tnemec (for exterior exposed steel, concrete, plaster).

2.02 PAINT MATERIALS

A. Paints: Provide Ready-Mixed, except field catalyzed coatings. Pigments shall be fully ground maintaining soft paste consistency, capable of being readily and uniformly dispersed to complete homogeneous mixture. Paints shall have good flowing and brushing properties and be capable of drying or curing free of streaks and sags.

B. Acceptable materials: Provide the best professional quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers that comply with the current EPA rules and regulations in place where the project is located. Materials not displaying manufacturer's identification as a standard, best professional line product, and not complying with the EPA rules and regulations, will not be acceptable. The quantity of titanium dioxide, the use of clays, aluminum silicate, talc and the purity of acrylic materials are a few of the criteria which will be used by the Architect in determining equivalency of materials.

C. Accessory Materials: Linseed oil, shellac, solvents, and other materials not specified but required to achieve required finishes shall be of high quality and approved by manufacturer.

D. Proprietary names used to designate colors, materials or finishes are not intended to imply that products of above-named manufacturers are unacceptable or excluded where equivalent products are available.

E. Paint Pigments shall be pure, unfading, applicable types suited to the substrates and services to which they are to be applied.

2.02 COLOR SCHEDULES

A. The Contract Documents may contain a color schedule indicating intent for colors, textures and final finishes.

2.03 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as allowed by the rules and regulations (i.e. EPA) in place at the project location.

B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

2.04 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

B. If materials are not listed for items such as patching, provide quality patching materials specifically developed for the use, applied as per the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
   1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
   2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
   1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

C. Do not paint over dirt, dust, rust scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint finish.

D. Beware of a condition known as “critical lighting”. This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but “does not” equalize smoothness or surface texture. Any corrective action to drywall must be done by the drywall contractor prior to decorating.

E. Follow all applicable procedures and requirements in the Lead Based Paint & Coating Removal Guidelines furnished by FUSD prior to applying new paint coatings.

3.02 PROTECTION

A. Protect previously installed work and materials which may be affected by Work of this Section.
   1. Protect prefinished surfaces, lawns, shrubbery and adjacent surfaces against paint and damage.
   2. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or splatter from fouling surfaces to being painted.
   3. Protect surfaces, equipment, and fixtures from damage resulting from use of fixed, movable and hanging scaffolding, planking, and staging.

3.03 MATERIALS PREPARATION

A. General:
   1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations.
   2. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring:
   1. Stir materials before application, producing a mixture of uniform density.
   2. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
   3. Use only thinners approved by paint manufacturer and only within recommended limits.

C. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.04 SURFACE PREPARATION

A. General:
   1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations and instructions and as herein specified, for each particular substrate condition.
      a. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
      b. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting

each space or area, reinstall removed items without damaging treated surfaces by using workmen who are skilled in the necessary trades.

c. Clean each surface to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Schedule cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly painted surfaces.

d. Follow all applicable procedures and requirements in the Lead Based Paint & Coating Removal Guidelines furnished by FUSD prior to and during all preparation work.

B. Surface Preparation of NEW materials

1. Cementitious Materials:

a. Prepare cementitious surfaces of concrete, concrete block and cement plaster to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

b. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

c. Clean concrete and concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. flush floor with clean water to neutralize acid, and allow to dry before painting.

2. Wood surfaces:

a. Clean wood surfaces until free from dirt, oil, and other foreign substance with scrapers, mineral spirits, and sandpaper, as required.

b. Sandpaper smooth finished wood surfaces exposed to view, and dust off. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried.

c. Unless specifically approved by the Architect, do not proceed with painting of wood surfaces until the moisture content of the wood is 12% or less as measured by a moisture meter.

3. Metal surfaces:

a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.

b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

d. Thoroughly clean ferrous surfaces, which are not galvanized or shop-coated, of dirt, oil, grease, loose mill scale and other foreign substances by solvent or mechanical cleaning.
e. On galvanized surfaces, clean surface contaminants using non-petroleum based solvent for the initial cleaning, and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.
f. Allow to dry thoroughly before application of paint.

C. Surface preparation of existing surfaces:
1. Clean all surfaces scheduled to receive new paint coatings free from all dirt, dust, oxidized paint film, loose particles and unsound paint coatings, and other foreign matter.
2. Locate unsound plaster, gypsum board, and similar unsound areas, and patch as needed to provide a smooth substrate for application of the paint coating.
3. Metal: Clean free from loose and unsound paint coatings and other surface contaminates which may impair the adhesion of the new paint coating.
4. Wood:
a. Clean free from loose and unsound paint coatings and other surface contaminates which may impair the adhesion of new paint coatings.
b. Sand sharp edges of paint film to a smooth feathered edge.
c. Fill, sand, and otherwise repair as needed to provide a smooth substrate for application of the new coating.
5. Stucco:
a. Clean free from all dirt and other foreign matter by the hydrowash method.
b. Provide a clean sound surface for the new paint coatings.
c. Repair cracks and voids to match the texture and plane of the area in which the repair occurs.
d. Remove graffiti (if any) prior to application of the new paint coatings.

3.05 PAINT APPLICATION

A. General:
1. Apply paint in accordance with manufacturer's directions and in strict compliance with all current EPA Standards, Rules and Regulations, and other governing regulations applicable at the time of application. Use applicators and techniques best suited for the substrate and type of material being applied.
2. Paint colors, surface treatments, and finishes are indicated in "schedules" of the Contract Documents.
3. Provide finish coats which are compatible with prime paints used.
4. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color, and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surface areas.

5. Paint surfaces behind moveable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.
6. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless indicated otherwise.
7. Touch up shop-applied prime coats which have been damaged, and touchup bare areas prior to start of finish coats application.
8. Slightly vary the color of succeeding coats.
   a. Do not apply additional coats until the completed coat has been inspected and approved.
   b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
9. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
10. Apply additional coats of fillers or primer to new materials such as stucco where needed to visually match the texture and sheen of adjacent existing surfaces that have been previously painted.

B. Schedule Painting: Apply first-coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
   1. Apply prime coat on material which is required to be painted or finished, and which has not been prime coated by others. Recoat primed or sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
   2. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
   3. Do not apply successive coatings until dry to where the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Minimum Coating Thickness: Apply each coat of materials at not less than manufacturer's recommended spreading rate, to establish a dry film thickness of not less than 1.2 mils or as recommended by the coating manufacturer.

D. Brush applications:
   1. Brush out and work the brush coats onto the surface in an even film.
   2. Completely cover to provide opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

E. Spray application:
   1. Except as specifically otherwise approved by the Architect, and allowed by governing regulations, confine spray application to metal framework and similar surfaces where hand brush work would be inferior.
   2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
   3. Do not double back with spray equipment to build up film thickness of two coats in one pass.

F. For completed work, match the approved Samples as to texture, color, and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.

G. Interior: Use "stipple" finish where enamel is specified. Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

H. Miscellaneous surfaces and procedures:
   1. Exposed mechanical/electrical items (not pre-finished):
      a. Finish electric panels, access doors, conduits, pipes, ducts, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
      b. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
      c. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
      d. Paint exposed piping, conduit and fittings, vents and jacks, pipe hangers and supports, electrical trays, piping shrouds, exposed equipment supports and frames.
   2. Exposed pipe and duct insulation:
      a. Apply one coat of latex paint on insulation which has been sized or primed under other Sections; apply two coats on such surfaces when unprepared.
      b. Match color of adjacent surfaces.
      c. Remove band before painting, and replace after painting.
   3. Hardware:
      a. Paint prime coated hardware to match adjacent surfaces;
      b. Paint metal portions of head seals, jamb seals, and astragal seals to match the color of the door frame unless otherwise directed by the Architect.
   4. Wet areas:
      a. In toilet rooms and contiguous areas, add an approved fungicide to paints.
      b. For oil base paints, use 1% phenolmercuric or 4% tetrachlorophenol.
      c. For water emulsion and glue size surfaces, use 4% sodium tetrachlorophnate.
   5. Equipment: Unless otherwise noted, paint the following equipment items:
      a. Mechanical equipment and exposed roof HVAC Units and platforms.
      b. Electrical Panels and switchgear
      c. Accessory items

6. Application to EXISTING previously painted areas: Areas and materials that are being REPAINTED may receive two coats of paint in lieu of the three specified. Apply primer coat when there is any chance of lack of adhesion at existing previously painted walls.
7. Existing cabinets indicated to be painted, if previously painted, shall be prepared and painted inside as well as outside.

3.06 CLEAN-UP AND FINAL PROTECTION

A. During the progress of work, remove paint splatters from window glass and other surfaces. Remove splattering paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finish surfaces.

B. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.
1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for the protection of their work after completion of painting operations.
2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.
3. Remove all rubbish, paint cans, and accumulated materials resulting from work in each space or room. All areas shall be left in a clean, orderly condition.

3.07 PAINT SCHEDULE

A. General:
1. Materials required to complete the painting are herein specified and listed by material number and name for each type of finish and substrate, solely to establish a standard for kind, quality and function. Unlisted manufacturers of equivalent products, upon compliance with these specifications and with the requirements of specification Section "Product Substitutions", may submit their products for approval.
2. Except for specialty items or as otherwise specified, all materials shall be by one manufacturer.

3.08 PAINTING SYSTEMS SCHEDULE

A. Provide the following paint systems for the various substrates, as indicated. This list complied with the EPA rules and regulations at last checking. Changes in product compliance after the date listed above should be brought to the attention of the Architect.

3.09 PAINTING FINISHES

A. Apply the following finishes to the surfaces specified and/or as scheduled on the finish and paint schedule on the Drawings. Apply all materials in accord with manufacturer's instructions on properly prepared surfaces and foundations coats. Manufacturers shall verify that the paint type specified is the appropriate product for the location and application depicted on the drawings.
   1. If not included in the Drawings, the Architect will issue a Color Schedule prior to start of painting to designate the various colors and locations required for work.
   2. Apply additional primers, sealers and fillers in addition to the listed finish coats as required for the substrate and as recommended by the manufacturer.

1. EXTERIOR SYSTEMS:

FRAZEE	**DUNN-EDWARDS**	**ICI GLIDDEN PRO**	**SHERWIN WILLIAMS**

Note: Equal or better products by TNEMEC are preferred and acceptable for exterior steel, concrete, wood, cement plaster, and concrete block paint coatings.

a. Cement Plaster – Flat; 100% Acrylic:

1st Coat: 266 Epotilt	W709 Eff-Stop	3030 Bond Prep	A24W300 Loxon
2nd Coat: 203 Duratec II	W701V Evershield	2200 Dulux Pro Flat	B2WF51 Weathclad

Previously Painted Cement Plaster:

Spot Prime Where Needed:			
266 Epotilt	W709 Eff-Stop	3030 Bond Prep	A24W300 Loxon
One Coat: 203 Duratec II	W701V Evershield	2200 Dulux Pro Flat	A6 A-100 Flat

b. Concrete Tilt-Up – Flat; 100% Acrylic:

1st Coat: 266 Epotilt	W709 Eff-Stop	3030 Bond Prep	A24W300 Loxon
2nd Coat: 213 Superflat	W704V Acriflat	2210 Durus Flat	A6 A-100 Flat

Previously Painted Concrete Tilt-Up:

Spot Prime Where Needed:			
266 Epotilt	W709 Eff-Stop	3030 Bond Prep	A24W300 Loxon
One Coat: 203 Durantec II	W701V Evershield	2200 Dulux Pro Flat	B2WF51 Weathclad

c. Brick Masonry – Flat; 100% Acrylic:

1st Coat: 266 Epotilt	W709 Eff-Stop	3030 Bond Prep	A24W300 Loxon
2nd Coat: 203 Duratec II	W701V Evershield	2200 Dulux Pro Flat	B2WF51 Weathclad

Previously Painted Brick Masonry:

Spot Prime Where Needed:			
266 Epotilt	W709 Eff-Stop	3030 Bond Prep	A24W300 Loxon
One Coat: 203 Duratec II	W701V Evershield	2200 Dulux Pro Flat	B2WF51 Weathclad

d. Concrete Block – Flat; 100% Acrylic:

1st Coat: 262 Acrylic Block Filler	W305 Blocfil, Smooth	3010 Prep & Prime Block Filler	B25W25 Block Filler
2nd Coat: 203 Duratec II	W701V Evershield	2200 Dulux Pro Flat	B2WF51 Weathclad

e. Metal – Ferrous - Gloss:

1st Coat: 168 Prime Plus	W75 Untra Grip	4020 Devflex	B66W1 DTM Acrylic Primer
2nd Coat: 540 DTMGL	W10 WB Syn-Lustro	4218 Devflex Gloss	B66 DTM Gloss

f. Metal – Galvanized or Aluminum - Gloss:

Pretreatment: PC102150 Metal Container	Galva-Etch GE 123	Jasco Prep & Primer	B71Y1 DTM Wash Primer
1st Coat: 561 Acrylic Metal Primer	W8 WB Syn Lustro	4020 Devflex	B66W1 DTM Acrylic Primer
2nd Coat:143 Mirro Glide	W960V Permagloss	4208 Devflex	K34 Duration Gloss

g. Wood – Paint Finish – Gloss; 100% Acrylic:

1st Coat: 168 Prime Plus	W708 E-Z Prime	3210 Gripper	B51W20 Prep Rite Pro Black
2nd Coat: 143 Mirro Glide	W960V Permagloss	4208 DevFlex	K34 Duration Gloss

h. Wood – Stain Finish - Opaque:

1st Coat: Duckback, solid Body Stain	W704V Acri-Flat	2600 Wood Pride Solid Stain	A16 Pro Mar Solid Color Solid Stain
2nd Coat: Duckback Solid Body Stain	W704V Acri-Flat	2600 Wood Pride Solid Stain	A16ProMar Solid Color

i. Wood – Stain Finish – Semi-Transparent:

Two Coats: Duckback Superdeck, Semi-Transparent Stain	WPT-3 Weather Pro Flood Latex S/T	2610 Wood Pride Semi-Transparent	A15T5 WoodScapes

2. INTERIOR FINISH – Enamel: The following enamel paints are to be used for the final interior enamel paint application as directed on the Finish Schedule and in accordance with the base coats specified in the following Subparagraphs.

FRAZEE	**DUNN-EDWARDS**	**ICI GLIDDEN PRO**	**SHERWIN WILLIAMS**
Gloss Enamel (waterbase) 146 Arothane or 143 Mirro-Glide Gloss	W960V Permagloss	4208 Dev Flex	B21W51 ProClassic Gloss
Semi-Gloss Enamel (waterbase)	W901 Permasheen	1407 Dulux Semi Gloss	HP D18Q Eminence SG
Eggshell Enamel (waterbase) 126 Mirro-Glide Low Sheen Or 122 Endurable Eggshell	W440E Decosheen or W7300 Spartasheen	1412 Ultra-Hide	B20W200 Pro Mar 200 Eggshell

a. Gypsum Drywall:

1st Coat: 061 Aqua Seal	W101V Vinylastic	1000-1200 Prep & Prime	B28W200 Prep-Rite Primer
2nd & 3rd Coat: Gloss as directed	Gloss as directed	Gloss as directed	Gloss as directed

b. Plaster, Concrete:

1st Coat: 168 Prime Plus	W707V Unikote	3210 Gripper	B28W101 Prep Rite Classic
2nd & 3rd Coat: Gloss as directed	Gloss as directed	Gloss as directed	Gloss as directed

c. Concrete Block:

1st Coat: 262 Block Filler	W6329 Block Filler	4000 Block Filler	B25W25 Block Filler
2nd & 3rd Coat: Gloss as directed	Gloss as directed	Gloss as directed	Gloss as directed

d. Wood:

1st Coat: 168 Prime Pus	W707V Unikote	3210 Gripper	B28W101 Prep Rite Classic
2nd & 3rd Coat: Gloss as Directed	Gloss as directed	Gloss as directed	Gloss as directed

e. Metal Ferrous:

1st Coat: 561 Acrylic Metal	W715 Ultra Grip	4020 Devflex	B66W1 DTM Acrylic Primer
2nd & 3rd Coat: Gloss as Directed	Gloss as directed	Gloss as directed	Gloss as directed

f. Metal – Non Ferrous/Galvanized, Aluminum:

1st Coat: 561 Acrylic Metal Primer	W715 Ultra Grip	4020 Devflex	B66W1 DTM Acrylic Primer
2nd & 3rd Coat: Gloss as directed	Gloss as directed	Gloss as directed	Gloss as directed

g. Galvanized Metal - Doors:

1st Coat: 564 Acrylic Metal Primer	W715 Ultra Grip	4020 Devflex	B66W1 DTM Acrylic Primer
2nd & 3rd Coat: Gloss as directed	Gloss as directed	Gloss as directed	Gloss as directed

3. Finish – Stain and Lacquer - Satin

a. Wood:

FRAZEE	DUNN-EDWARDS	ICI GLIDDEN PRO	SHERWIN WILLIAMS
1st Coat: Zar Wood Stain Zar Wood Filler	V109 Stainseal II	1700 Wood pride Stain	A67Fi Wood Classics Stain
Filler as directed:	Jasco Paste Wood Filler	Jasco Paste Wood Filler	Minwax Wood Filler
2nd Coat: Valpar Sanding Sealer	McCloskey 2000 Sanding Sealer	Gemini 200-0012 High Build Sealer	B44MJ91Sealer
3rd & 4th Coat:	MC 80-6841 Satin		A68 Wood Classics Satin
Valspar Lacquer	Lacquer (275 voc)	1802 Woodpride Satin	

4. Epoxy Coating – Interior (Finish – Gloss):

a. Wood:

FRAZEE	DUNN-EDWARD	ICI GLIDDEN PRO	SHERWIN WILLIAMS
1st Coat:	W 715 Ultra-Grip	3210 Gripper Primer	B28W101 Prep Rite Classic
2nd Coat:	S-60 Water Base Epoxy (Rustoleum)	4408 Devoe Tru-Glaze	B70 Water Based Catalyzed Epoxy
3rd Coat:	S-60 Water Base Epoxy (Rustoleum)	4408 Devoe Tru-Glaze Epoxy	B70 Water Based Catalyzed Epoxy

b. Concrete:

1st Coat: Comex E-4000 Waterboone Epoxy Primer			
2nd & 3rd Coat: Comex U-5000 Polyurethane Gloss	S-60 Water Base Epoxy (Rustoleum)	4408 Tru-Glaze Epoxy	B70 Water Based Catalyzed Epoxy

c. Gypsum Drywall:

1st Coat: Comex E-4000 Waterborne Epoxy Primer			
	W 715 Ultra-Grip	3210 Griper Primer	B51W20 ProBlock
2nd & 3rd Coat: Comex U-5000 Waterborne Polyurathane Gloss	S-60 Water Base Epoxy (Rustoleum)	4408 Devoe Tru-Glaze	B70 Water Based Catalyzed Epoxy

d. Metal – Ferrous and Galvanized:

1st Coat: Ameron 400	43-5 Corrobar (ferrous)	Devoe DevRan 203 Epoxy Primer	B66W1 DTM (ferrous)
	43-7 Galv-Alum (galvanized)		B71Y1 (galvanized)
2nd & 3rd Coat: Amershield Top Coat	S-60 Water Base Epoxy (Rustoleum)	Devoe 4408 Tru-Glaze Epoxy	B70 Water Based Catalyzed Epoxy

5. Concrete Floor Sealers - Clear:

FRAZEE	DUNN-EDWARDS	ICI GLIDDEN PRO	SHERWIN WILLIANS

a. Concrete:

1st & 2nd Coats: Rainguard International Microseal Concrete/Masonry Sealer	Okon W-1 Waterproofing	Rain Guard Micro Seal Concrete	Oron W-1 Weatherproofing

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes, but is not exclusive to, the following:
   1. Parking lot signage (verify/coordinate with site signage in Division 32).
   2. Accessible path of travel.
   3. Building and room identification.
   4. Restroom signage.
   5. Exit signage (non-illuminated).
   6. Occupancy signage.
   7. Miscellaneous signage

1.02 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.03 SUBMITTALS

A. Product Data: For each type of product indicated, including construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for signs. Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
   1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
   2. Provide message list, typestyles, and graphic elements, including tactile characters and Braille, and layout for each sign.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for each different type of sign.

D. Samples for Verification: For each type of sign, include the following Samples to verify color selected:

1. Panel Signs: Full-size Samples of each type of sign required.
2. Dimensional Characters: Full-size Samples of each type of dimensional character (letter and number) required. Show character style, material, finish, and method of attachment.
3. Approved samples will be returned for installation into Project.

1.04 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines, Applicable requirements of CBC Section 1117B.5 and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

D. General: Provide signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

1.05 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.06 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
   a. Deterioration of polymer finishes beyond normal weathering.
   b. Deterioration of embedded graphic image colors and sign lamination.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide standard products manufactured by Architectural Signing, Inc. 4082 Glencoe Ave Marina del Rey, CA. 90261 or a comparable product by another manufacturer, from those listed below, approved by the Architect in advance.
   1. ACE Sign Systems, Inc.
   2. Best Sign Systems Inc.
   3. Gemini Incorporated.
   4. Mohawk Sign Systems.

2.02 MATERIALS

A. Steel:
   1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating, either commercial or forming steel.
   2. Steel Members Fabricated from Plate or Bar Stock: ASTM A 529/A 529M or ASTM A 572/A 572/M, 42,00-psi minimum yield strength.
   3. For steel exposed to view on completion, provide materials having flat, smooth surfaces without blemishes. Do not use materials whose surfaces exhibit pitting, seam marks, roller marks, rolled trade names, or roughness.

B. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of 5005-H15.

C. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

D. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating:
   1. Impact Resistance: 16 ft/lbf/in. per ASTM D 256, Method A.
   2. Tensile Strength: 9000lbf/sq. in. per ASTM D 638.
   3. Flexual Modulus of Elasticity: 340,000 lbf/sq. in. per ASTM D 790.
   4. Heat Deflection: 265 deg. F at 264 lbf/sq. in. per ASTM D 678.
   5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.

E. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:
   1. Edge Condition: Beveled.
   2. Corner Condition: Square (1/8" radius) unless indicated otherwise.

F. Brackets: Fabricate brackets and fittings for bracket-mounted signs from extruded aluminum to suit panel sign construction and mounting conditions indicated. Factory-paint brackets in color matching Architect's sample.

G. Graphic Content and Style: Provide sign copy that complies with CBC Section 1117B.5 and requirements indicated on Drawings for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage. Where copy has not been determined or is not indicated, provide copy as selected by Architect. All indicated copy is subject to change without additional cost to Owner until released for production following approval by Owner and Architect.

H. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with CBC Section 1117B.5, ADA-ABA Accessibility Guidelines and 2010 CBC. Text shall be accompanied by California contracted (Grade 2) Braille. Produce precisely formed characters with square cut edges free from burrs and cut marks in contrasting color from background.
1. Panel Material: Photopolymer and Clear acrylic sheet with opaque color coating, subsurface applied (Non-Glare Finish).
2. Raised-Copy Thickness: Not less than 1/32 inch raised letters in Sans Serif upper case characters.
3. Braille shall have domed or rounded dots 1/10 inch on center in each cell with 2/10 inch space between cells and raised 1/40 inch above the background.

I. Subsurface Copy: Apply minimum 4-mil- thick vinyl copy to back face of clear acrylic sheet forming panel face to produce precisely formed opaque image. Image shall be free from rough edges.

J. Applied Copy: Die-cut characters from vinyl film of nominal thickness of 3 mils with pressure-sensitive adhesive backing. Apply copy to glass and wall surfaces where indicated.

K. Anchors and Inserts: Provide nonferrous-metal or stainless steel anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use epoxy set toothed steel or expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into stucco, concrete or masonry work.

2.03 DIMENSIONAL CHARACTERS

A. Cast Characters: Form individual letters and numbers by casting. Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free from pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Comply with requirements indicated for finish, style, and size.
1. Material: Formed-acrylic sheet or metal as indicated.

B. Fabricated Characters: Fabricate letters and numbers to required sizes and styles, using metals and thicknesses indicated. Form exposed faces and sides of characters to produce surfaces free from warp and distortion. Include internal bracing for stability and attachment of mounting accessories. Comply with requirements indicated for finish, style, and size.
   1. Acrylic: 3/4" inch thick.
   2. Character Height: As indicated.
   3. Character Style: As selected.

2.04 PANEL SIGNS/SYMBOLS

A. Exterior and Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, complying with CBC Section 1117B.5 and the following requirements:
   1. Acrylic Sheet: 0.125 inch thick (Non-Glare Finish).
   2. Aluminum sheet: 0.080 inch thick (Non-Glare Finish).
   3. Edge Condition: Bullnose.
   4. Corner Condition: 1/4" radius.
   5. Mounting: Unframed.
      a. Wall mounted.
      b. Manufacturer's standard non-corroding anchors for substrates encountered.
   6. Color: As selected by Architect from manufacturer's full range.

B. Colored Coatings for Acrylic Sheet: For copy colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are Non-Glare UV and water resistant for three years for application intended.
   1. Color: As selected by Architect from manufacturer's full range.

C. Toilet Room Door Geometric Symbols: Refer to drawings for graphic layout. Provide door sign plaques with the following attributes:
   1. Material: Cast-acrylic sheet (Non-Glare).
   2. Plaque color: As approved by Architect to contrast with door background color.
   3. Perimeter: Unframed with eased edge, 1/8" radius corners.
   4. Size: Men's door shall have an equilateral triangle with 12" sides, 1/4" thick with a vertex pointing upward.
   5. Size: Women's door shall have a 12" diameter circle, 1/4" thick.
   6. Size: A unisex door shall have a 12" diameter circle, 1/4" thick, and a 1/4" thick contrasting color triangle inscribed and superimposed on the circle.
   7. Colors: As selected by Architect, subject to jurisdictional approval.

D. Toilet Room Wall Signs: Refer to drawings for graphic layout. Provide door sign plaques with the following attributes:
1. Material: Cast-acrylic sheet (Non-Glare Finish), 3/16" thick.
2. Plaque color: Blue (or other approved contrasting color).
3. Type color: White (or other approved contrasting color).
4. Perimeter: Unframed with 1/4" radiused corners.
5. Size: 8" minimum width x 9" minimum height with a minimum 6" high field for raised wheelchair logo and adjacent man/woman 5" to 6" high pictogram.
6. Margins: As indicated on drawings.
7. Copy: 3/4" high (minimum) Sans Serif Bold raised (1/32") letters stating gender with California contracted (Grade 2) Braille below repeating gender (or reading "RESTROOM" or "STAFF") at Unisex toilets.
8. Text color: White (or other approved contrasting color).

F. Exit Signs: Accessible exit and exit route sign text and locations shall be as indicated by the drawings.
1. Material: 1/8 inch thick x 4 inch minimum high non-glare acrylic plate.
2. Plaque color: As selected by Architect from manufacturer's full range.
3. Perimeter: Unframed with 1/4" radiused corners.
4. Size: As indicated by the drawings and as required for length of text.
5. General: Sub-surfaces Process, with 1/32 inch raised letters with integral contracted (Grade 2) Braille centered below letters.
6. Text: 3/4 inch high Sans Serif Bold lettering.

G. Room Identification Signs (Exterior and Interior): Sign locations shall be as indicated by the drawings.
1. Material: 1/8 inch thick x 4 inch minimum high (8" at classrooms) non-glare acrylic plate.
2. Plaque color: As selected by Architect from manufacturer's full range.
3. Perimeter: Unframed with 1/4" radiused corners.
4. Size: As indicated by the drawings and as required for length of text.
5. General: Sub-surfaces Process, with 1/32 inch raised border with California Contracted integral Grade 2 braille copy.
6. Text: 3/4 inch high Sans Serif Bold lettering.
7. Locations: Provide one sign at each main room entry door plus additional signs as required to comply with ADA-ABA and CBC standards and as indicated by drawings.
8. Copy allowance: Allow fifteen (15) letters and three (3) numerals for each sign. Classrooms shall be identified by a N or S letter, hyphen and room number only (6" high copy) with braille below.

H. Occupancy Signs: Sign text and locations shall be as indicated by the drawings.
1. Material: 1/8 inch thick x 6 inch high non-glare acrylic plate.
2. Plaque color: As selected by Architect from manufacturer's full range.
3. Perimeter: Unframed with 1/4" radiused corner.
4. Size: As indicated by the drawings and as required for length of text.
5. General: Sub-surfaces Process, with 1/32 inch raised letters.
6. Text: 1/2 inch high (48 point). Sans Serif lettering.
7. Copy for Sign at Assembly Rooms: As indicated by the drawings.

I. International Symbol of Accessibility Signs: As indicated by drawings.
1. Figure Symbols: Building Entrance Sign; Size: 6" x 6", typical.
2. Assistive Listening Systems: At assembly room with public address systems provide symbol of Access for Hearing Loss in accordance with CBC Figure 11B-14C. Along with specific location for pick-up indicated by drawings.

J. Metal Signs: General
1. Materials: Reflectorized sign shall be porcelain on steel with beaded text; galvanized steel post and concrete footing. See drawings for text.
2. Type Imagery:
a. Type Style: Helvetica Medium, all upper case.
b. Arrangement: Use standard spacing between letters, words, numbers and lines; centered typically.

K. Accessible Parking Signs: As indicated by drawings.
1. Material: 0.080-inch aluminum or other noncorrosive material.
2. Background Color: Blue.
3. Copy Material: Reflective vinyl.
4. Mounting: Post mounted. Wall/fence mounted where applicable and indicated by drawings.

L. Symbols of Accessibility: Provide 6-inch- high symbol fabricated from opaque nonreflective vinyl film, 0.0035-inch nominal thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.

2.05 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.
1. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.06 FINISHES, GENERAL

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not

acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.07 ACRYLIC SHEET FINISHES

A. Colored Coatings for Acrylic Sheet: For copy colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for three years for application intended.

2.08 ACCESSORIES

A. Applied Vinyl Film: Provide opaque non-reflective die cut vinyl film, 0.0035-inch minimum thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.

B. Mounting Methods: Use concealed fasteners, double-sided vinyl tape or silicone adhesive as indicated and approved by Architect fabricated from materials that are not corrosive to sign material and mounting surface.

C. Anchors and Inserts: Provide nonferrous-metal or stainless steel anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.09 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.

C. Verify that items are sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
   1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
   2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent wall, preferably on right side. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door (centered 9" minimum from face of jamb on latch side of door).

B. Wall-Mounted Exterior Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
   1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes located 1/4" to 1/2" in from edges at all 4 corners as approved by Architect. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

C. Wall-Mounted Interior Signs: Attach panel signs to wall surfaces using methods indicated below:
   1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
   2. Silicone-Adhesive Mounting: Use liquid-silicone adhesive recommended in writing by sign manufacturer to attach signs to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended in writing by sign manufacturer to hold sign in place until adhesive has fully cured.
   3. Where panel signs are scheduled or indicated to be mounted on glass, provide matching plate on opposite side of glass to conceal mounting materials.

D. Bracket-Mounted Units: Provide manufacturer's standard brackets, fittings, and hardware as appropriate for mounting signs that project at right angles from walls and ceilings. Attach brackets and fittings securely to walls and ceilings

with concealed fasteners and anchoring devices to comply with manufacturer's written instructions.

E. Dimensional Characters: Mount characters using standard fastening methods recommended in writing by manufacturer for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
   1. Projected Mounting: Mount characters at projection distance from wall surface indicated.

3.03 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION

SECTION 10 28 00

TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Toilet accessories in new construction.

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Carpentry" for framed openings and backing/blocking to accommodate and support accessories.
   2. Division 09 "Finishes" for various adjacent finishes.

1.02 SUBMITTALS

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, finishes for each type of accessory specified and manufacturer's warranty.

B. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Schedules and room designations indicated on Drawings in the product schedule.

D. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

E. Shop drawings including floor plans and/or interior elevations at min. 1/4" per foot scale to indicate mounting locations and heights for all accessories and required backing.

1.03 QUALITY ASSURANCE

A. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Schedules.
   1. Products of other manufacturers listed in Part 2 with equal characteristics, as judged solely by Architect, may be provided.

2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.04 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Schedule at the end of this Section.

B. Available Manufacturers:
1. Provide all individual items from a single manufacturer, unless specifically indicated otherwise.
2. Where indicated on the Drawings or otherwise required, provide the following items or equal products of another manufacturer approved in advance by the Architect. Use of Bobrick numbers and descriptions below are intended to represent the desired level of quality of workmanship, materials, gages, etc., and are not intended to limit the suppliers of these products. With Architects and Owners approval, other products may be used as an equal from those listed below:
   a. American Dispenser Company.
   b. Bradley Corporation.
   c. Accessory Specialties.
   d. Parker
   e. Waltrous.
   f. Fort James.
   g. Bay West.
   h. World Dryer.

2.02 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch minimum nominal thickness, unless otherwise indicated.

B. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.

D. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

E. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.
   1. Anchors and fasteners shall be capable of developing a retaining force commensurate with the strength of the accessory to be mounted, and well suited for use with the supporting structure.
   2. Where exposed fasteners are permitted, provide oval head fasteners with finish matching the accessory.

2.03 FABRICATION

A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. All finishes shall be stainless steel, with satin finish, for all items of this Section unless specifically indicated otherwise

C. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

D. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.

E. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
   1. Provide galvanized steel backing sheet, not less than 0.034 inch and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

F. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper and theft-resistant installation, as follows:

1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

PART 3 - EXECUTION

3.01 GENERAL

A. Refer to Drawing Plans, Details, Notes and Interior Elevations for locations and mounting heights of all accessories. Verify all accessories can be mounted to comply with disabled access requirements per CBC Section 1115B and notify Architect of any conflicts prior to installing blocking/backing, cutting-in of openings and ordering of any related materials. Provide alternative units of equal or better quality and capacity to suite the specific accessory location. Paper towel dispensers, hair dryers, napkin dispensers and similar accessories located in accessible path of travel within toilet rooms shall not protrude more than 4" from the face of the wall along he accessible route to fixtures.

B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

C. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.03 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.04 SCHEDULE: In addition to accessories indicated in the Drawings, provide the following Product Items:

A. Paper Towel Dispensers:
1. At locations indicated, Owner furnished and installed by Contractor.

B. Toilet Tissue Dispensers:
1. Multi-Roll Toilet Tissue Paper Dispenser, Surface Mounted, Model # Bobrick, B-2888, Satin-finish stainless steel.
a. This model to be installed at the following:
1) Each water closet as indicated.

C. Soap Dispensers:
a. Not required

D. Sanitary Napkin Dispensers:
1. Sanitary Napkin/Tampon Dispensers: No required

E. Sanitary Napkin Disposals:
1. Sanitary Napkin Disposal: F & E by Owner

F. Grab Bars:
1. Grab bars: Bobrick Series, sizes and locations per Architect's drawings.
a. Grab bar (W/C side wall) B-5806.99 x 48" (1 ¼" diameter)
b. Grab bar (W/C rear wall) B-5806.99 x 36" (1 ¼" diameter)
c. Provide 258 series anchor plate at toilet partitions and/or backing in wall to support a minimum 250 pound point load on grab bars.
d. Provide grab bars in length and at locations shown for accessible shower as indicated in drawings.

G. Mirrors:
1. Tempered Glass Mirrors, Mirror with Stainless Steel Channel Frame, Model # Bobrick B 1658 Series (1/4" tempered glass) 24" x 36":
a. Unisex Toilet Rooms 12 & 20

H. Toilet Seat cover Dispensers:
1. At location indicated, Owner furnished and Contractor installed.

I. MISCELLEANOUS:

1. Mop and Broom Holder: At all mop/service sinks and where indicated in drawings, provide mop and broom holder complying with the following:
a. Products: Available products include the following:
Bobrick B-224 x 36

J. Accessible Folding Shower Seat:
1. Bradley 9569 Reversible Phenolic Shower Seat.
a. Provide at accessible shower as indicated in drawings.

K. Towel Hooks:
1. Bobrick B-2116 heavy duty clothes hook with concealed mounting.
a. Provide 2 at each vanity area and 1 at each shower/toilet room adjacent bedrooms as indicated in drawings.

END OF SECTION

SECTION 10 44 13

FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and cabinets for fire extinguishers.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and cabinets.
   1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

D. Warranty: Sample of special warranty.

1.03 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

C. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

1.04 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fails in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: Six years from date of Substantial Completion.

1.05 SEQUENCING

A. Apply decals on field-painted, fire protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.01 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
      b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
      c. Larsen's Manufacturing Company.
      d. Potter Roemer LLC.
   2. Valves: Manufacturer's standard.
   3. Handles and Levers: Manufacturer's standard.
   4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.02 FIRE PROTECTION CABINET

A. Basis-of-Design Product: J. L. Industries Ambassador model 1015 W10 or 1017 W10 With SAF-T-LOCK, factory painted, with vertical "FIRE EXTINGUISHER" decal; or a comparable product by one of the following:
   1. Kidde Fyrnetics.
   2. Larsen's Manufacturing Company.
   3. Potter Roemer; Div. of Smith Industries, Inc.

4. Watrous; Div. of American Specialties, Inc.

B. Cabinet Construction: Non-rated or rated as required by wall type as indicated on Drawings.
   1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Steel sheet.

D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.
   1. Rolled-Edge Trim: 2-1/2-inch

E. Door Material: Steel sheet.

F. Door Style: Center glass panel with frame.

G. Door Glazing: Tempered break glass.

H. Door Hardware: Manufacturer's standard door-operating hardware (that does not require grasping by persons with disabilities) of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide manufacturer's standard.
   2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

I. Accessories:
   1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
   2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
   3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
      a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
         1) Location: Applied to cabinet glazing.
         2) Application Process: Decals.
         3) Lettering Color: White.
         4) Orientation: Vertical.

4. Alarm: Manufacturer's standard alarm that actuates when fire protection cabinet door is opened and that is powered by batteries.

J. Finishes:
1. Manufacturer's standard baked-enamel paint for the following:
a. Exterior of cabinet, door and trim except for those surfaces indicated to receive another finish.
b. Interior of cabinet and door.
2. Steel: Factory baked enamel or powder coat.

2.03 MOUNTING BRACKETS FOR PORTABLE EXTINGUISHERS

A. Available Manufacturers:
1. Provide mounting brackets from same manufacturer as extinguishers.

B. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
1. Color: Red.

C. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
a. Orientation: Vertical.

2.04 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
1. Weld joints and grind smooth.
2. Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material.
3. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.05 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Examine fire extinguishers for proper charging and tagging.
1. Remove and replace damaged, defective, or undercharged fire extinguishers.

3.02 PREPARATION

A. Prepare recesses for recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:
1. Fire Protection Cabinets: 54 inches maximum above finished floor to top of cabinet or as indicated.

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semirecessed fire protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

C. Identification: Apply decals at locations indicated.

D. Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

3.04 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 20 01 00

GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The preceding General Conditions shall form a part of this Section with the same force and effect as though repeated here. The provisions of this Section shall also apply to Divisions 21, 22, 23 and 25 and shall be considered a part of those sections.

1.2 CODES AND REGULATIONS

A. All work and materials shall be in accordance with current rules and regulations of applicable codes. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to these codes. Should the Drawings or Specifications call for material or methods of construction of a higher quality or standard than required by these codes, the Drawings and Specifications shall govern. Applicable codes and regulations include, but are not necessarily limited to, the following:

California Building Code	CCR Title 24, Part 2
California Electrical Code	CCR Title 24, Part 3
California Mechanical Code	CCR Title 24, Part 4
California Plumbing Code	CCR Title 24, Part 5
California Energy Code	CCR Title 24, Part 6
California Fire Code	CCR Title 24, Part 9
Local Codes	

1.3 DEFINITIONS

A. Provide: The term "provide" as used in these specifications or on the drawings shall mean furnish and install.

B. Piping: The term "piping" as used in these specifications or on the drawings shall mean all pipe, fittings, valves, hangers, insulation, etc. as may be required for a complete and functional system.

C. Ductwork: The terms "duct" or "ductwork" as used in these specifications or on the drawings shall mean all ducts, fittings, joints, dampers, hangers, insulation, etc. as may be required for a complete and functional system.

D. Wiring: The term "wiring" as used in these specifications or on the drawings shall mean all wiring, conduit, boxes, connections, transformers, relays, switches etc. as may be required for a complete and functional system.

1.4 PERMITS AND FEES

A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required. All charges are to be included in the work.

1.5 COORDINATION OF WORK

A. Examination: Before starting work, thoroughly examine existing and newly completed underlying and adjoining work and conditions on which the installation of this work depends. Report to the Engineer in writing all conditions which might adversely affect this work.

B. Layout: Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. Some work may be shown offset for clarity. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc. shall be carefully planned prior to installation of any work in order to avoid all interference with each other, or with structural, electrical, architectural or other elements.

C. Verification: If discrepancies are discovered between drawing and specification requirements, the more stringent requirement shall apply. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment. No work shall be prefabricated or installed prior to this coordination. No costs will be allowed to the Contractor for any prefabrication or installation performed prior to this coordination. Verify the proper voltage and phase of all equipment with the electrical plans.

1.6 GUARANTEE

A. Guarantee shall be in accordance with the General Conditions. The Contractor shall repair any defects due to faulty materials or workmanship and pay for any resulting damage to other work which appears within the guarantee period. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner through the Engineer.

1.7 QUIETNESS

A. Piping, ductwork and equipment shall be arranged and supported so that vibration is a minimum and is not transmitted to the structure.

1.8 DAMAGES BY LEAKS

A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

1.9 EXAMINATION OF SITE

A. The Contractor shall examine the site, compare it with Plans and Specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.10 COMPATIBILITY WITH EXISTING SYSTEMS

A. Any work which is done as an addition, expansion or remodel of an existing system shall be

compatible with that system.

1.11 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new unless otherwise noted. Materials and equipment of a given type shall be by the same manufacturer. Materials and equipment shall be free of dents, scratches, marks, shipping tags and all defacing features at time of project acceptance. Materials and equipment shall be covered or otherwise protected during construction as required to maintain the material and equipment in new factory condition until project acceptance.

1.12 SUBMITTALS

A. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material or equipment shall not be ordered or installed until written review is processed by the Engineer.

All shop drawings must comply with the following:

1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory. FAX submittals are not acceptable.

2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor, table of contents, and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings.

3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be high-lighted, circled or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled or detailed.

B. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and features desired. Unless otherwise noted, alternate manufacturers may be submitted for review by the Engineer. Calculations and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items. At the Engineer's request, furnish locations where equipment similar to the substituted equipment is installed and operating along with the user's phone numbers and contact person. Satisfactory operation and service history will be considered in the acceptance or rejection of the proposed substitution.

C. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. If a resubmittal is required, submit a complete copy of the Engineer's review letter requiring such with the resubmittal.

1.13 MANUFACTURER'S RECOMMENDATIONS

A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

1.14 SCHEDULING OF WORK

A. All work shall be scheduled subject to the review of the Engineer and the Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work, and shall cause no delay to other Contractors engaged upon this project or to the Owner. HVAC equipment and functions, whether existing or new, shall be maintained in operating condition whenever the facility is occupied, unless otherwise approved by the Owner.

1.15 OPENINGS, CUTTING AND PATCHING

A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

1.16 EXCAVATION AND BACKFILL

A. General: Barrel of pipe shall have uniform support on sand bed. Sand shall be free from clay or organic material, suitable for the purpose intended and shall be of such size that 90 percent to 100 percent will pass a No. 4 sieve and not more than 5 percent will pass a No.

200 sieve. Unless otherwise noted, minimum earth cover above top of pipe or tubing outside building walls shall be 24", not including base and paving in paved areas.

B. Excavation: Width of trench at top of pipe shall be minimum of 16", plus the outside diameter of the pipe. Provide all shoring required by site conditions. Where over excavation occurs, provide compacted sand backfill to pipe bottom. Where groundwater is encountered, remove to keep excavation dry, using well points and pumps as required.

C. Backfill:

1. 6" Below, Around, and to 12" Above Pipe: Material shall be sand. Place carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.

2. One Foot Above Pipe to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.

D. Compaction: Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at top, bottom and one-half of the trench depth. Perform these tests at three locations per 100' of trench.

1.17 CONTINUITY OF SERVICES

A. Existing services and systems shall be maintained except for short intervals when connections are made. The Contractor shall be responsible for interruptions of services and shall repair damage done to any existing service caused by the work. If utilities not indicated on the drawings are uncovered during excavation, the Contractor shall notify the Engineer immediately.

1.18 PROTECTIVE COATING FOR UNDERGROUND PIPING

A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru-Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. John-Mansville. Protective coating shall be extended 6" above surrounding grade.

1.19 ACCESS DOORS

A. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings. 16-gage steel frame and 14-gage steel door with paintable finish, except in ceramic tile, where door shall be 16-gage stainless steel with satin finish. Continuous hinge. Deliver doors to the General Contractor for installation. Milcor. Unless otherwise noted, the minimum sizes shall be as follows:

1 valve up to 1-1/2"	12" x 12"
1 valve up to 3"	16" x 16"
Fire damper, VAV box, coil	20" x 24"

1.20 HOUSEKEEPING PAD

A. Housekeeping pads shall be 6" high concrete, 3000 PSI strength, unless otherwise noted. Pad shall extend 6" beyond the largest dimensions of the equipment, unless otherwise noted. The top edge of the pad shall have a 3/4" chamfer. Unless otherwise noted, the pad shall have #4 reinforcing bars at 12" on center, each way, located at mid-depth of the pad. If not poured at the same time as the slab with pad rebar tied to slab rebar, the pad shall be anchored as follows: Drill 5/8" diameter, 3" deep hole in slab. Install 7" long, #4 rebar with Simpson Set epoxy system. Provide a minimum of 4 of these anchors per pad, but no more than 4 feet apart in either direction. Anchor points shall be 12" from the edge of the pad.

1.21 CONCRETE ANCHORS

A. Steel stud with expansion wedge requiring a drilled hole – powder driven anchors are not acceptable. Minimum spacing shall be 12 diameters center to center and 10 diameters center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80% of the ICC Evaluation Service Report (ESR) values. Minimum concrete embedment shall be the nominal embedment listed in the ESR table. Hilti Kwik Bolt TZ.

1.22 EQUIPMENT ANCHORING AND OTHER SUPPORTS

A. Mechanical systems (equipment, ductwork, piping, conduit, etc.) shall be anchored in accordance with the CBC. All systems mounted on concrete shall be secured with a concrete anchor at each mounting point. All air handlers shall be mounted on spring isolators. Secure base plate as indicated above. Attachment of equipment, ductwork, piping, conduit, etc. supported on curbs or platforms shall be made to the side of curbs and platforms, where possible. Where screws or lag bolts must be installed through the top of a sheet metal cap, the installation shall be as follows. Pre-drill pilot hole. Fill pilot hole with polyurethane sealant. Install screw or lag bolt with a flat washer and an EPDM washer adjacent to the sheet metal.

1.23 SUPPORTS AND SEISMIC RESTRAINTS

A. Any structural element required to hang or support piping, ducts or equipment provided under this Division and not shown on other drawings shall be provided under this Division.

B. Mechanical systems (equipment, ductwork, piping, etc.) shall be provided with supports and seismic restraints in accordance with the CBC. Submit anchorage calculations and details stamped and signed by a structural engineer registered in the State of California. Submit shop drawings showing location, type and detail of restraints. Submit manufacturer's data for restraints. Restraint system shall be B-Line (OSHPD OPA-0114), or approved equal.

1.24 PAINTING

A. Paint all black iron supports, hangers, anchors, etc. with two coats of rust resisting primer. Also paint all uninsulated black iron piping exposed to weather with two coats of rust resisting primer.

1.25 FLASHING

A. Whenever any part of the mechanical systems penetrate the roof or exterior wall, the openings shall be flashed and counter-flashed water tight with minimum 22 gauge galvanized sheet metal. Flashing shall extend not less than eight inches from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed in accordance with the recommendations of the National Roofing Contractor's Association.

1.26 SYSTEM IDENTIFICATION

A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by pre-printed markers or stenciled marking, and include arrows to show direction of flow. Pre-printed markers shall be the type that wrap completely around the pipe, requiring no other means of fastening such as tape, adhesive, etc. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches for equipment connections is not required.

B. Below Grade Piping: Bury a continuous, pre-printed, bright-colored, metallic ribbon marker capable of being located with a metal detector with each underground pipe. Locate directly over buried pipe, 6" to 8" below finished grade.

C. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-4). Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the exterior of the unit.

1.27 CLEANING

A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work. This includes but is not limited to building surfaces, piping, equipment and ductwork, inside and out. Surfaces shall be free of dirt, grease, labels, tags, tape, rust, and all foreign material.

1.28 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Printed: Three copies of Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts list for all faucets, trim, valves, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. AC-3). All Wiring Diagrams shall agree with reviewed Shop Drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Pumps, Fans, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.

B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instructions that apply to the control system. The Engineer's office shall be notified 48 hours prior to this meeting.

C. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed and verbal) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

1.29 RECORD DRAWINGS

A. The Contractor shall obtain one set of prints for the project, upon which a record of all construction changes shall be made. As the work progresses, the Contractor shall maintain a record of all deviations in the work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. building, curbs, walks. In addition, the water, gas, sewer, under floor duct, etc. within the building shall be recorded by offset distances from building walls. An electronic copy of the original drawings will be made available to the Contractor. The Contractor shall transfer the changes, notations, etc. from the marked-up prints to the electronic copy. The record drawings (marked-up prints, electronic drawings disc and a hard copy) shall be submitted to the Engineer for review.

1.30 ACCEPTANCE TESTING

A. The Contractor shall perform, document and submit all acceptance testing as required by California Code of Regulations, Title 24, Part 6.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION

SECTION 21 05 00

FIRE SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The preceding General Mechanical Provisions shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE

A. General: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The entire facility shall be fire sprinklered.

B. Design/Calculations: The sprinkler system shall be designed and sized by hydraulic calculations in accordance with NFPA No. 13 and fire authority requirements. Calculations shall be included in submittals.

C. Preparation of Drawings and Material Data Sheets: Before starting work, complete shop drawings showing locations and sizes of all sprinkler heads, piping, valves, etc., shall be prepared. Shop drawings shall also include material data sheets giving manufacturer's name and catalog numbers, equipment descriptions giving dimensions, capacities, performance curves, and complete layouts. Piping shall be concealed in walls, above the ceilings or below grade unless otherwise noted. Exposed piping must be approved by the Architect and Engineer. Exposed piping shall be specifically noted on shop drawings.

1.3 WORK SPECIFIED ELSEWHERE

A. Fire alarm system.

1.4 SUBMITTAL REVIEW PROCESS

A. Submit shop drawings, calculations and material data sheets to fire authority for approval.

B. Submit approved shop drawings, calculations and material data sheets to Engineer for review.

C. Material or equipment shall not be ordered, nor work proceed until Engineer processes written review.

PART 2 - PRODUCTS

2.1 STANDARDS

A. All materials shall be in accordance with NFPA No.13 "Standard for the Installation of Sprinkler Systems". Underground mains shall be in accordance with NFPA No. 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances".

2.2 PIPING MATERIALS

A. General: The pressure rating of all piping, valves, flanges and other piping accessories shall be in accordance with code and fire authority requirements. Pressure ratings shall exceed the highest possible working pressure.

B. Piping:

1. Underground: Polyvinyl chloride, Class 200, AWWA C900, with rubber ring joints, ASTM D1869. Cast or ductile iron fittings, AWWA C110 or C153, Class 250 or higher, with rubber ring joints, ASTM D1869.

2. Above Grade:

a. 2" and Smaller: Threaded black steel pipe, ASTM A53, minimum wall thickness per NFPA 13. 300 psi WOG black malleable iron threaded fittings, UL listed.

b. 2-1/2" and Larger: Welded black steel pipe, ASTM A53, minimum wall thickness per NFPA 13. Carbon steel welding fittings, ANSI B16.9. Roll grooved, listed pipe couplings may be used for assembling welded sections.

C. Gate Valve:

1. 2" and Smaller: All bronze, rising stem. UL listed.

2. 2-1/2" and Larger: Iron body, bronze mounted, outside screw and yoke. UL listed. (UL listed butterfly valves may be substituted for 4" and larger gate valves above grade.)

D. Check Valve:

1. 2" and Smaller: All bronze swing check. UL listed.

2. 2-1/2" and Larger: Iron body, bronze mounted swing check. UL listed.

2.3 SPRINKLER HEAD

A. Automatic sprinkler head, semi-recessed (Central Sprinkler Corp., Model A) in areas with finished ceilings, standard heads elsewhere. UL listed. Temperature ratings shall be in accordance with NFPA No. 13. Provide extra heads (of each type installed) in accordance with code requirements. Heads installed with deflector lower than 7'-6" above floor shall have wire guards. Heads shall have chrome finish in areas with finished ceilings and standard finish in areas with exposed piping. Heads installed in areas with finished ceilings shall have metal escutcheons with same finish as head.

2.4 ALARM VALVE ASSEMBLY

A. Standard wet type alarm valve assembly and water motor gong complete with retarding chamber and trim as required by the authority having jurisdiction. Provide flow switch for connection to alarm system. Provide tamper switch. UL listed.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. General: Piping shall be concealed in walls, above the ceilings or below grade unless otherwise noted. Exposed piping must be approved by the Architect and Engineer. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. Depth of cover in traffic areas shall be 36 inches (minimum).

B. Standards: All piping shall be installed in accordance with NFPA No. 13 "Standard for the Installation of Sprinkler Systems". Underground mains shall be installed in accordance with NFPA No. 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances".

C. Miscellaneous:

1. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings or floors in finished areas.

2. Pattern: Sprinklers shall be installed in a symmetrical pattern with lighting fixtures and with ceiling pattern. Heads located in lay-in ceilings shall be centered in panel.

3. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" annular clearance between sleeve and pipe for piping 3" and smaller and 2" annular clearance for piping 4" and larger.

4. Access: Provide access doors as required for all valves, devices, etc.

5. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe, or pipe insulation sealed with fire rated materials in accordance with the requirements of the fire authority having jurisdiction.

6. Concrete Thrust Blocks: Shall be constructed at all valves, tees, elbows, bends, crosses, reducers and dead ends in loose-joint pipe. Blocks shall cure a minimum of 7 days before pressure is applied. Concrete shall be 2500 psi mix.

7. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards.

3.2 IDENTIFICATION

A. All controls, piping, valves and equipment shall be labeled for function and service in accordance with NFPA No.13.

3.3 TESTS AND ADJUSTMENTS

A. Unless otherwise directed, tests shall be witnessed by a representative of the Engineer and an inspector of the authority having jurisdiction. Contractor shall notify fire authority at least 48 hours prior to testing. At various stages and upon completion, the system must be tested in the presence of the enforcing agency. Work to be concealed shall not be

enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and the entire work retested. Test all systems in accordance with fire authority requirements and NFPA No.13 and No.24.

3.4 CERTIFICATION

A. At completion of the project, a certificate of inspection from authority having jurisdiction indicating installation and testing in accordance with referenced standards shall be delivered to the Owner through the Engineer.

END OF SECTION

SECTION 22 04 00

PLUMBING

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The preceding General Mechanical Provisions shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE

A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:

1. Sanitary sewer system.
2. Domestic water system.
3. Storm drain system, including Rain Water Leaders, (RWL).
4. Fuel gas system.
5. Drain system (including condensate drain).
6. All equipment as shown or noted on the drawings or as specified.

B. Work Specified Elsewhere:

1. Line voltage power wiring to equipment, motor starters in motor control centers, disconnect switches and installation of all starters are included in the Electrical Sections unless otherwise noted.
2. Access doors.
3. Concrete and reinforcing steel unless specifically called for on the drawings or specifications.
4. Painting unless specifically called for in the drawings or specifications.
5. Carpentry.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Sanitary Sewer:

1. Soil, Waste and Vent Piping (Non-Pressurized):

a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end with neoprene gasket and stainless steel retaining sleeve, CISPI 301, ASTM A888. AB&I, Charlotte, Tyler. Size 2" and smaller above grade may be standard weight galvanized steel, ASTM A120/A53, with coated cast iron recessed drainage fittings, ANSI B16.12. 2" and smaller exposed to view shall be galvanized steel, ASTM A120/A53, with coated cast iron recessed drainage fittings, ANSI B16.12.

b. Outside Building: Polyvinyl chloride (PVC), SDR-35, ASTM D3034 with

PVC fittings with rubber ring joints. Piping with less than 24" of cover outside building walls shall be cast iron.

2. Cleanouts: Comparable models of Josam, Wade or Zurn are acceptable. Floor Cleanouts: Smith 4020 with nickel bronze top in finished areas; Smith 4220 in utility areas. Wall Cleanouts: Smith 4530 with stainless steel cover and screw. Pipe Cleanouts: Iron body with threaded brass plug.

3. Cleanout Box: Precast reinforced concrete. Cast iron lid marked for service. Christy F22 in foot traffic areas; G5 in roadways.

B. Storm Drain (Including Rain Water Leader, RWL):

1. Piping:

a. Inside Building and Within Five Feet of Building Walls: Same as Soil, Waste and Vent Piping, except as otherwise noted on drawings. Where exposed to view on exterior of building, piping shall be galvanized steel with recessed drainage fittings.

C. Water and Gas:

1. Cold Water Piping:

a. Inside Building, Within Five Feet of Building Walls, and All Above Grade:

1) Schedule 40 galvanized steel pipe, ASTM A120/A53. 150 psi galvanized malleable iron screwed fittings, ANSI B16.3.

-or-

2) Hard temper seamless copper, ASTM B88. Wrought copper fittings, ANSI B16.22. Type L with brazed joints (1100F, min.). 1-1/2" and smaller above grade may be soldered, 95-5 tin-antimony solder. All nipples shall be red brass (85% copper).

b. Outside Building - Below Grade:

1) Same as Inside Building. Galvanized steel shall have protective coating.

-or-

2) 3" and Smaller: Schedule 40 Polyvinyl chloride (PVC) with solvent weld fittings where approved by administrative authority.

-or-

3) 4" and Larger: Polyvinyl chloride, AWWA C900, Class 150, ASTM D1784, ASTM D2241, where approved by administrative authority, cast iron fittings with rubber ring joints, ASTM D1869.

2. Hot Water Piping:

a. Inside Building - Above Slab: Same as Cold Water Piping - Inside Building.

b. Outside Building or Below slab: Pre-insulated. Type L copper core. 1" foamed polyurethane insulation. Polyvinyl chloride jacket. Sealed ends. Rubber ring internal slip joint. Fittings shall be wrought copper, with brazed joints (1100F, min.). Ricwil, Thermal Pipe Systems.

3. Gas Piping:

   a. Inside Building and All Above Grade: 2" and Smaller: Schedule 40 galvanized steel pipe, ASTM A120/A53. 150 psi galvanized malleable iron screwed fittings, ANSI B16.3, ANSI B31.8. Flexible connections shall be convoluted yellow brass with dielectric couplings, AGA approved. 2-1/2" and larger: Schedule 40 black steel pipe, ASTM A120/A53. Standard weight carbon steel welding fittings, long radius ells, ANSI B16.9.

   b. Inside Building - Below Grade to Five Feet Outside Building: Same as Inside Building and All Above Grade. Provide sleeves and vents acceptable to administrative authority.

   c. Outside Building - Below Grade: Polyethylene pipe and fittings, ASTM D2513, where allowed by administrative authority. PolyPipe GDY 20, PE 2406/2708. Otherwise, piping shall be coated schedule 40 steel.

4. Valves and Specialties:

   a. Valves:

      1) General: Manufacturer's model numbers are listed to complete description. Equivalent models of Crane, Milwaukee, Nibco, Stockham or Walworth are acceptable. All valves of a particular type or for a particular service shall be by the same manufacturer. Ball valves may be substituted for 2" and smaller gate valves above grade. Butterfly valves may be substituted for 2-1/2" and larger gate valves above grade.

      2) Gate Valve: 2" and Smaller: All bronze. Rising stem. Union bonnet. Wedge disk. Malleable iron handwheel. 200 psi WOG. Stockham B-105. 2-1/2" and Larger: Iron body, bronze mounted. Non-rising stem. Wedge disk. 200 psi WOG. Flanged or AWWA hub end as applicable. Stockham G-612. Underground valves shall have square operating nut. Provide one operating "T" handle for underground valves.

      3) Butterfly Valve: Iron threaded lug body. Aluminum bronze disk. O-ring seals. Resilient, removable seat. 416 stainless steel shaft. 6" and smaller valves shall have multi-position lever handle. 8" and larger valves shall have gear operator. Provide 2" extension neck at insulated pipes. Demco Series NE, Stockham.

      4) Globe Valve: 2" and Smaller: All bronze. Renewable TFE disk. Union bonnet. Malleable iron handwheel. 300 psi WOG. Stockham B-22. 2-1/2" and Larger: Iron body. Flanged. Bronze mounted. Rising stem. Bolted bonnet. Renewable seat and disk. 200 psi WOG. Stockham G-512.

      5) Check Valve: 2" and Smaller: All bronze swing check, regrinding. 200 psi WOG. Stockham B-319. Check valves for air systems shall be the spring- loaded, quick-closing type, Stockham B-322-TS. 2-1/2" and Larger: Iron body, flanged, bronze mounted, swing

check. 200 psi WOG. Stockham G-931.

6) Ball Valve: Full port. Bronze or brass body, cap, stem, disk and ball. Screwed connection. Lever handle. TFE seat. O-ring seals. 300 psi WOG. Valves in gas piping systems must be UL listed for gas distribution. Apollo, Jomar.

7) Plug Valve: Valves in gas piping systems must be UL listed for gas distribution. 4" and Smaller: Eccentric bronze or nickel plated semi-steel plug. Semi-steel body. Bronze bushings. Buna-N-rings. 175 psi WOG. DeZurik Series 400. 1-1/2" and smaller may be full port ball valves. Apollo, Jomar. 6" and Larger: Lubricated plug cock. Cast iron or semi-steel body and plug. 200 psi WOG. Flanged. Wrench handle. Provide one operating "T" handle for underground valves. Resun R-1431.

8) Valve Box: Precast reinforced concrete. Cast iron lid marked for service. Christy F22 in foot traffic areas; G5 in roadways.

b. Miscellaneous Specialties:

1) Temperature and Pressure Relief Valve: ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. Watts.

2) Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi. Size 2-1/2" and Larger: Grooved pipe, synthetic gasket, malleable iron housing. Victaulic Style 77, Type "E" gasket.

3) Dielectric Coupling: Insulating union or flange rated for 250 psig. EPCO.

4) Shock Absorber: Multiple bellows. All stainless steel construction. Designed and applied in accordance with PDI WH201. Amtrol, Smith, Wade, Zurn.

5) Gas Pressure Reducing Valve: Capacity and pressure ratings as indicated on drawings. American Meter.

6) Flexible Connection: Corrugated bronze core covered with high tensile bronze tubular braid. 150 psi working pressure. 2" and smaller shall have screwed connections. 2-1/2" and larger shall have flanged connections. Flexonics, Keflex.

D. Drain Piping (including Condensate): Same as inside building cold water piping.

E. Flue and Vent Connector Piping: Per water heater manufacturer's recommendations.

F. Miscellaneous Piping Items:

1. Pipe Support:

a. Pipe Hanger: Steel "J" hanger with side bolt for piping 4" and smaller; steel

clevis hanger for piping 5" and larger. Load and jam nuts. Size and maximum load per manufacturer's recommendation. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B-Line, Unistrut.

b. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco, Superstrut.

c. Construction Channel: 12-gage, 1-5/8" x 1-5/8" galvanized steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut.

2. Flashing: Vent flashing shall be 4 lb/ft2 lead, 16" sq. flange, length sufficient to be turned down 2" into vent. Oatey. Flashing for other piping through roof shall be prefabricated galvanized steel roof jacks with 16" sq. flange. Provide counter flashing clamp-on storm collar with stainless steel band, and seal water tight with mastic. For cold process built-up roof, material shall be 4 lb/ft^2 lead instead of galvanized steel.

2.2 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Pre-Molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft2-F at a mean temperature of 50F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping, thickness shall be 1" for pipe sizes 2" and less; 1-1/2" thickness for pipe sizes 2-1/2" and larger. Certainteed, Knauf, Johns-Manville, Owens-Corning.

C. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft2-F at a mean temperature of 50F. 1-1/2" thickness. Knauf, Johns-Manville, Owens-Corning.

D. PVC Jacket (for pipe, fittings and valves): Pre-molded polyvinyl chloride (PVC) jackets, 0.020" thickness. Size to match application. Provide solvent weld adhesive and PVC vapor barrier pressure sealing tape by same manufacturer. Zeston.

E. Stretchable Glass Fabric: Reinforcing mesh. 10 X 20 continuous filament glass yarns per inch. Johns-Manville.

F. Vapor Barrier Coating: Childers CP-30LO.

G. Lagging Adhesive: Childers CP-50A.

H. Aluminum Jacketing: Aluminum pipe and fitting jacketing. 0.016" thickness for straight pipe. 0.024" thickness for fittings. Stucco-embossed finish. Integral moisture barrier. Provide pre-fabricated aluminum strapping and seals by same manufacturer. Childers.

I. Outdoor Mastic: Childers CP-10.

J. Foamed Plastic: Rubber based elastomeric preformed pipe insulation. Thermal conductivity shall not exceed 0.27 Btu-in/hr-ft^2-°F at a mean temperature of 70°F. 1/2" thick. Provide

adhesive by same manufacturer. Armstrong Armaflex.

K. Molded Closed Cell Vinyl (Piping Insulation Under Accessible Lavatories and Sinks): Fully molded closed cell vinyl, 3/16" thick. Internal ribs on drain insulation to provide air gap. Thermal conductivity shall not exceed 1.17 BTU-in/hr-ft^2-F at an average temperature of 73F. Weep hole in cleanout nut enclosure. Out of sight nylon fastening system. Hinged cap over valve to allow access for servicing. Truebro Lav-guard.

2.3 FIXTURES

A. General: Provide rough-in for and install all plumbing fixtures shown on drawings. Except in equipment rooms, all trim, valves and piping not concealed in wall structure, above ceiling or below floors, shall be brass with polished chrome plate finish, unless noted otherwise. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.

B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures and trim. Manufacturer's model numbers are listed to complete description.

C. Stops and P-Traps: All fixtures shall be provided with stops and P-Traps as applicable. Wall mounted faucets, valves, etc. shall have integral stops or wall mounted stops.

1. Stops: All hot and cold water supplies shall be 1/2" I.P.S. inlet angle stops with stuffing box, loose key lock shield, and brass riser (3/8" for 2-1/2 gpm and less, otherwise 1/2"). McGuire, Speedway.

2. P-Traps: Semi-cast brass, ground joint. 17-gage. Unobstructed waterway. California Tubular, McGuire.

2.4 EQUIPMENT

A. General Requirements:

1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.

2. Start-up: All equipment shall be started and tested in accordance with the manufacturer's written instructions. Provide the inspector of record with factory start-up literature for each mechanical equipment item. Demonstrate to inspector that the start-up procedure has been completed. Start-up sheets shall be completed and submitted with O&M manuals. Start-up sheets shall be signed by the owner of the installing contractor, certifying that start-up has been completed per manufacturer's written instructions.

3. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.

4. Ratings:

a. Gas: Gas burning equipment shall be furnished with 100% safety gas shut-off, intermittent pilot ignition, and be approved by AGA.

b. Electrical: Electrical equipment shall be in accordance with NEMA standards and UL or ETL listed where applicable standards have been established.

5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.

6. Electrical:

a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be NEMA rated, manual reset, and shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.

b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. General:

1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by the Engineer. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted. For piping connected to equipment mounted on springs, provide flex connections. Provide secondary drain piping where required.

2. Joints:

a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made

with three threads exposed.

b. Welded or Brazed: Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100F. Welding or brazing shall be performed by a Certified Welder or Brazer as certified by an organization/institution that uses standards recognized by the American Welding Society (AWS) and meets the requirements of the ASME Boiler and Pressure Vessel Code, Section 9.

c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.

d. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards.

3. Fittings and Valves:

a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.

b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.

c. Unions: A union shall be installed on the leaving side of each valve, at all sides of automatic valves, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.

d. Valves: All valves shall be full line size. Provide shut-off valve for each building and each equipment connection. Provide shut-off valve at each point of connection to existing piping. At equipment connections, valves shall be full size of upstream piping, except that gas valves within 18" of the point of connection to the equipment may be the same size as the equipment connection.

4. Pipe Support:

a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. Copper piping systems which protrude through a surface for connection to a fixture stop or other outlet shall be secured with a drop ell, Grinnell No. 9788; nipple through surface shall be threaded brass.

1) Pressure Pipe:

Pipe Size (Inches)	Maximum Spacing Between Supports (ft.)*		
	Copper	Steel	Plastic
1/2	6	6	4
¾	6	8	4
1	6	8	4
1-1/4	6	10	4
1-1/2	6	10	4
2	10	10	4
2-1/2	10	10	4
3	10	10	4
4	10	10	4

*Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves or other fittings. Plastic piping shall be supported per the manufacturer's recommendations. Seismic requirements may reduce maximum spacing.

2) Gravity Drain Pipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.

b. Hot and Cold Water Piping: All hot and cold water piping shall have isolating shield; no portion of this piping shall touch the structure without an isolating shield except at anchor points for fixture rough-in.

c. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.

5. Miscellaneous:

a. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings, or floors in finished areas.

b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" annular clearance between sleeve and pipe for piping 3" and smaller, otherwise 2" annular clearance. Piping through walls below grade shall be sealed with Link-Seal.

c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of the fire authority having jurisdiction.

d. Concrete Thrust Blocks: Shall be constructed at all valves, tees, elbows, bends, crosses, reducers and dead ends in loose-joint pipe. Blocks shall cure a minimum of 7 days before pressure is applied. Concrete shall be 2500 psi mix.

e. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined, except that bronze valves may be installed in ferrous piping without dielectric couplings.

f. Exposed Pipe at Fixtures: Piping extending from finished surfaces into a finished room shall be chrome plated brass, except under kitchen sinks in commercial kitchens.

B. Sanitary Sewer Piping:

1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch. Bell and spigot piping shall be installed with barrel on sand bed; excavate hole for bell.

2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface.

3. Vents: Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10' of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2' minimum from gutters, parapets, ridges and roof flashing.

C. Storm Drain (Including Rain Water Leader, RWL): Similar to Sanitary Sewer. Piping with less than 24" of cover outside building walls shall be cast iron.

D. Water Piping: Connections to branches and risers shall be made from top of main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Minimum pipe size shall be 3/4", unless otherwise noted. Exposed fixture stops and flush valves shall be installed with brass nipples for copper piping and galvanized nipples for galvanized piping. Nipples are to extend from outside of wall to fitting at header or drop behind finish wall surfaces. Pipe nipples shall be same size as stop or flush valve. Provide shut off for each building and each connection to equipment. Provide shock absorber with shut-off valve and access panel where noted on drawings and upstream of quick-closing manual valves, solenoid valves and flush valves. Only equipment mounted on vibration isolators shall be connected with flexible connections. Underground hot water and cold water piping which run parallel to each other shall be installed a minimum of 3 feet apart.

E. Gas Piping: Installation shall comply with CPC and NFPA 54 (National Fuel Gas Code). Shall be pitched to drain to dirt legs at low points. No unions shall be installed except at connections to equipment. Provide shutoff and dirt leg at each equipment connection. Only equipment mounted on vibration isolators shall be connected with flexible connectors. Under floor piping shall be sleeved and vented. Plastic pipe and fittings shall be joined in accordance with manufacturer's recommendations. Metal to plastic transition fittings shall be installed at all transitions. Provide 14-gage insulated tracer wire secured to pipe at 10' intervals with nylon ties. Terminate tracer 6" above grade at both ends.

F. Drain Piping (Including Condensate): Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide TEE with clean-out plug at all changes of direction. Provide trap at each air handling unit to prevent air leakage. Only equipment mounted on vibration isolators shall be connected with flexible connection.

G. Flue Piping: Flue piping shall be installed in accordance with its UL listing and the manufacturer's instructions.

3.2 PIPING INSULATION INSTALLATION:

A. Domestic Hot Water:

1. General: All domestic hot water piping, fittings and accessories shall be insulated.

2. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied pressure sealing tape.

3. Fittings and Valves:

   a. Wrap all fittings and valves with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Solvent weld. Seal all joints with factory supplied pressure sealing vapor barrier tape with 1-1/2" (min.) overlap on both sides of joint. Insulate valves to stem. Do not insulate unions, flanges or valves unless water temperature exceeds 140°F or the piping is exposed to weather.

   b. For miscellaneous fittings and accessories for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the fiberglass blanket with stretchable glass fabric, one coat of lagging adhesive and a final coat of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.

4. Equipment: Storage tanks and other equipment through which there is normally circulation, shall be insulated with materials similar to those described in Paragraph 2.2. It shall be the Contractor's responsibility to provide adequate insulation and finish, weatherproofing for equipment exposed to the weather, and a neat-appearing installation. Submit materials and method of installation to Engineer for review.

5. Piping Exposed to Weather:

   a. All piping and fittings exposed to weather shall have, in addition to the above-described insulation, an aluminum jacketing. Secure in place with factory supplied straps. Install all joints to prevent water entry. All joints shall be sealed with outdoor mastic.

   b. For miscellaneous fittings for which aluminum jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the insulation with stretchable glass fabric and at least two coats of outdoor mastic.

6. Additional Finish for Exposed Piping and Equipment: All piping and equipment exposed to view but protected from the weather shall be given an additional finish of PVC jackets.

B. Cold Water Piping-Freeze Protection: All cold water piping exposed to weather shall be insulated with foamed plastic, cover valves to stem, and jacketed with aluminum.

C. Piping Insulation Under Accessible Lavatories and Sinks: Hot water piping, hot water stops and related drain piping under accessible lavatories and sinks shall be insulated with 3/16" thick molded closed cell vinyl. Installation shall be in accordance with manufacturer's

instructions.

3.3 FIXTURE INSTALLATION

A. Fixture Height: Shall be as indicated on Architectural drawings.

B. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.

C. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary 1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

D. Floor Mounted Fixtures: Shall be provided with proper support plates. Grout at the floor with waterproof ceramic tile grout.

E. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

3.4 EQUIPMENT INSTALLATION

A. General: It shall be the responsibility of the equipment installer to insure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment. All equipment shall be securely anchored in place.

B. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS

A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Engineer. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections, however, all connections between sections previously tested and new section shall be included in the new test.

B. Gravity Systems:

1. Sanitary Sewer: All ends of the sanitary sewer system shall be capped and lines filled with water to the top of the highest vent, 10' above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.

2. Drains (Including Condensate): Similar to Sanitary Sewer.

3. Storm Drain, including Rain Water Leaders, (RWL): Similar to Sanitary Sewer.

C. Pressure Systems:

1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.

2. Domestic Hot and Cold Water Piping: Maintain 100 psig water pressure for 4 hours.

3. Backflow Preventer: All backflow preventers shall be tested according to manufacturer's recommendations and the USC Cross Connection Control and Hydraulic Research Manual (8th Edition). Testing shall be performed by an AWWA Certified Backflow Prevention Assembly Tester. Contractor shall certify in writing to the Engineer the date which backflow preventers were tested and by whom test was witnessed.

4. Gas Piping: Maintain 100 psig air pressure for 4 hours.

3.6 DISINFECTION

A. Disinfect all domestic water piping systems in accordance with AWWA Standard C651, "AWWA Standard for Disinfecting Water Mains", and in accordance with administrative authority. Disinfection process shall be performed by the Contractor and witnessed by a representative of the Engineer. During procedure signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, the Contractor shall collect water samples and send them to an independent lab for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Engineer.

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SECTION 23 08 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The preceding General Mechanical Provisions shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE

A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:

1. Air distribution system.
2. All equipment as shown or noted on the drawings or as specified.
3. Refrigeration system.
4. System energy balance.
5. Coordinate with Section 250900 (EMS) regarding location and installation of system sensors, valves, actuators, etc., and to provide simultaneous start-up.

B. Work Specified Elsewhere:

1. Line voltage power wiring to equipment, motor starters in motor control centers, disconnect switches and installation of all starters are included in the Electrical Sections, unless otherwise noted.
2. Connection of gas and condensate drains to equipment.
3. Energy management system (EMS).
4. Access doors.
5. Concrete and reinforcing steel unless specifically called for in the drawings or specifications.
6. Painting unless specifically called for in the drawings or specifications.
7. Carpentry.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refrigerant Piping:

1. Piping: Hard drawn Type ACR copper, dried and capped. Wrought copper fittings, silver alloy brazed, 1100F, Silfos. Size 3/8" and smaller shall be refrigerant tube, ASTM B280.

2. Valves and Specialties:

a. Line Valve: Bronze body, ball type. TFE locked in seals. Back seated valve

stem. Contromatics C-11.

b. Filter-Drier: Replaceable core. Capacity in accordance with ARI Standard 710. Sporlan "Catch-All".

c. Moisture Indicator - Sight Glass: Double port. Henry, Sporlan.

d. Vibration Isolating Connection: Seamless flexible bronze tubing, braid covered. Suitable for system pressure. American.

e. Solenoid Valve: Full line size. Sporlan.

B. Miscellaneous Piping Items:

1. Pipe Support:

a. Pipe Hanger: Steel "J" hanger with side bolt for piping 4" and smaller; steel clevis hanger for piping 5" and larger. Load and jam nuts. Size and maximum load per manufacturer's recommendations. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B-Line, Unistrut.

b. Insulation Support: Calcium silicate insulation, 100 psi, or heavy density fiberglass, 100 psi. Insulation thickness equal to adjoining pipe insulation. Steel support shield or saddle. Provide vapor barrier for chilled water piping. Insulation and/or vapor barrier shall extend 1" beyond steel support. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Pipe Shields, Inc., Uni-Grip.

c. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco.

d. Construction Channel: 12-gage, 1-5/8" x 1-5/8" galvanized steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut.

2. Flashing: Flashing for piping through roof shall be prefabricated galvanized steel roof jacks with 16" square flange around pipe. Provide clamp-on storm collar and seal water tight with mastic. Maintain dielectric separation between copper and galvanized materials. For cold process built-up roof, material shall be 4 lb/ft^2 lead instead of galvanized steel.

2.2 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Flexible Elastomeric: Closed cell flexible elastomeric preformed pipe insulation. Thermal conductivity shall not exceed 0.27 Btu-in/hr-ft^2-°F at a mean temperature of 70°F. 1/2" thick. Provide #520 adhesive and Armafix insulation pipe hangers by same manufacturer. Armacell Armaflex.

C. Aluminum Jacketing: Aluminum pipe and fitting jacketing, 0.016" thickness for straight pipe. 0.024" thickness for fittings. Integral moisture barrier. Stucco-Embossed finish. Provide pre-fabricated aluminum strapping and seals by same manufacturer. Childers.

D. Outdoor Mastic: Childers CP-10.

E. Insulating Tape: Ground virgin cork and synthetic elastomeric. Black, odorless, and non-toxic. K factor 0.43 Btu-in/hr- ft^2-ºF or less. Non-shrinking. For outdoor use, provide protective finish by same manufacturer. Halstead.

2.3 DUCTWORK MATERIALS

A. General: All ductwork materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50. Shall comply with CMC.

B. Metal Ductwork: Metal ductwork shall be galvanized sheet steel, lock forming quality, ASTM A-653, with gage and construction to match SMACNA Standard for pressure required (26 gage minimum).

C. Flexible Ductwork: Insulated flexible ductwork. One pound per cubic foot glass fiber insulation, 1" thick where ductwork is within the building thermal insulation envelope, 1-1/2" thick where ductwork is outside the building thermal insulation envelope. Thermal conductivity shall not exceed 0.25 Btu-in/hr- ft^2-ºF at a mean temperature of 75ºF. Seamless vapor barrier jacket. Duct shall comply with NFPA 90A. Continuous internal liner bonded to galvanized steel wire helix. Duct shall be capable of continuous operation at 1-1/2" of water static pressure and 4,000 ft/min air velocity. Genflex, JPL.

D. Spiral Wound Metal Ductwork: Spiral wound factory fabricated, galvanized steel, gages in accordance with the CMC. Spiral lockseam shall be 6" on center, maximum, and shall comply with SMACNA spiral lockseam RL-1. All fittings shall be factory fabricated with all seams fully welded. Tees and laterals shall be conical type. Connections to plenums shall be with bell-mouth fittings. 8" and smaller ells shall be two piece die-stamped. Ells larger than 8" shall be five piece. United McGill. Shop fabricated fittings are not acceptable.

E. Duct Joints / Duct Sealants:

1. Rectangular Ducts: Duct joint connector shall be Ductmate 25/35 factory fabricated connector system with #440 gasket tape.

2. Round Ducts: All Joints Exposed to Weather: Sealant shall be G.E. "Silglaze II" silicone. Joints Not Exposed to Weather (Except Spiral Wound and Greater than 2" Pressure Class): Fiber tape and liquid adhesive. Hardcast DT-5300 or DT-5400 tape and FTA-20 adhesive, United McGill Uni-Cast. Spiral Wound Joints Not Exposed to Weather and All Joints on Greater than 2" Pressure Class: Sealant shall be Eco-Duct Seal 44-60, or United Duct Sealer.

F. Underground Duct: Polyvinyl chloride coated galvanized steel. Connections and fittings shall also be polyvinyl chloride coated steel. All duct and fittings shall have a 4 mil coating on both sides. Fasten with stainless steel screws and fiber tape in accordance with manufacturer's instructions. PCD, United McGill.

2.4 AIR TERMINALS AND DUCT FITTINGS

A. Grilles: (Grilles, Registers, Diffusers and Louvers)

1. Information on Drawings: Refer to Grille Schedule on the drawings for the list of grilles. Manufacturer's model numbers are listed to complete the description. Equivalent models of Carnes, Price, Titus or Tuttle and Bailey are acceptable. Manufacturer's facilities must include a testing lab. Refer to the floor plans for neck size, CFM, air diffusion pattern and fire damper, if required.

2. Performance: Submit complete performance data (throw, pressure drop, noise level, etc.) for all grilles proposed, other than those scheduled. Testing shall be in accordance with ANSI/ASHRAE 70. Sound level testing shall be in accordance with ARI Standard 885. If, according to the certified data of the manufacturer of the proposed units, the sizes indicated on the drawings will not perform satisfactorily, the units shall be reselected by the Contractor for the proper diffusion, spread, pressure drop, throw and noise level.

3. Frame and Accessories: All supply, return, and exhaust grilles shall have an opposed blade volume control damper unless otherwise noted. All surface mounted grilles shall have a perimeter gasket and flanged edge. All grilles shall have frames suitable for mounting in the surfaces designated by the architectural drawings. Key or screwdriver operated, no slide bars.

4. Finish: All ceiling and wall grilles and all louvers shall have a paintable white finish unless otherwise noted. Interior components (everything behind the face plate) shall be flat black. Floor grilles shall have an anodized aluminum finish unless otherwise noted.

B. Branch Duct Volume Damper: Volume control damper (VCD) in rectangular ducts shall be as follows: Opposed blade, 6" maximum blade width, 16-gage blade, 48" maximum length, nylon or oil impregnated bronze bearings, 1/2" diameter pin shaft, 16-gage channel frame, actuating rod and linkage out of air stream. VCD in round duct shall be as follows: Damper blade full height of branch and 1" less than branch width. All branch dampers shall have regulator with stamped steel handle, spring loaded shaft nut, cast body and serrated self-locking die cast core. Secure a 12" length of brightly colored plastic ribbon to handle for ease of location. Where rectangular or round ductwork is insulated, slit insulation to allow handle to protrude. Duro Dyne SRH-228 (with SB-112 end bearing for round ducts).

C. Extractor: Curved blade turns in adjustable position rigid frame. Tuttle and Bailey Deflectrol.

D. Turning Vanes: Double wall, hollow metal, air foil shape with trailing edge. Spacing in accordance with manufacturer's recommendations. Aero Dyne HEP.

E. Flexible Connection: UL listed neoprene coated 30 ounce fiberglass cloth. 3" metal, 3" fabric, 3" metal.

F. Fire and Combination Fire/Smoke Damper: California State Fire Marshal listed. UL listed. Hour rating as required by the rating of the wall, ceiling, floor, etc. in which it is installed. All dampers shall be Leakage Class II. Include mounting sleeve and angles. Combination fire/smoke dampers shall have normally-closed, non-stall factory electric actuator rated for

250°F (min.). Damper position switch. Remote test and reset switch with open/closed indicator lights. Dampers in round ducts shall be round sleeve with round blade, two retainer plates and mounting hardware for actuator.

G. Relief Vent: Factory fabricated, curb mounted gravity relief vent. Galvanized steel or aluminum. Throat area as indicated on drawings. Outlet area equal or greater than throat area. 1/2" birdscreen. Provide backdraft damper as specified elsewhere. Greenheck.

H. Duct Access Door: Insulated double wall door. Full piano hinge. Cam latch. Pressure rating to match application. Minimum size 10"x10". Air Balance.

2.5 DUCTWORK INSULATION MATERIALS

A. General: All ductwork insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Fiberglass Blanket: Thermal conductivity shall not exceed 0.27 Btu-in/hr-ft^2-°F at a mean temperature of 75°F. 3/4 lb/ft^3, 1-1/2" installed thickness. Installed R-value of 4.2. Faced with glass reinforced foil laminated to Kraft paper. Certainteed, Knauf, Johns-Manville, Owens-Corning.

C. Fiberglass Board: Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft^2-°F at a mean temperature of 75°F. 3 lb/ft^3. 2" thick where installed outside the building insulation envelope; 1" thick where installed inside the building insulation envelope.

D. Acoustic Lining: Glass fiber. Thermal conductivity shall not exceed 0.24 Btu-in/hr-ft^2-°F at a mean temperature of 75°F. Coated to prevent fiber erosion up to 6,000 ft/min. Noise reduction coefficient of 0.70 for 1" thickness; 0.85 for 2" thickness. 2" thick where installed outside the building insulation envelope; 1" thick where installed inside the building insulation envelope. Johns-Manville Permacote Linacoustic with Superseal anti-microbial edge treatment.

E. Bonding Adhesive: Childers CP-85.

2.6 EQUIPMENT

A. General Requirements:

1. Start-up: All equipment shall be started and tested in accordance with the manufacturer's written instructions and shall have a representative from the manufacturer provide factory start up procedures. Provide the inspector of record with factory start-up literature for each mechanical equipment item. Demonstrate to inspector that the start-up procedure has been completed. Start-up sheets shall be completed and submitted with O&M manuals. Start-up sheets shall be signed by the owner of the installing contractor, certifying that start-up has been completed per manufacturer's written instructions.

2. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.

3. Dimensions: Equipment must conform to space requirements and limitations as

indicated on drawings and as required for operation and maintenance. Where Architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.

4. Ratings:

   a. Electrical: Electrical equipment shall be in accordance with NEMA Standards and UL or ETL listed where applicable standards have been established.

5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. For equipment mounted on springs, provide flex connections. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.

6. Electrical:

   a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be NEMA rated, manual reset, shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.

   b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.

   c. Motors: Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction unless otherwise noted. Motors from 1 horsepower to 5 horsepower shall be the standard high efficiency type, Magnetek E-Plus. Motors 7-1/2 horsepower and larger shall be premium efficiency, Class F insulation, tested according to IEEE Standard 112, Method B. Magnetek E-Plus III. Motors in a fan air stream shall be TEFC or TEAO. Vertical motors exposed to weather shall be TEFC and shall have rain caps. Horizontal motors exposed to weather shall be TEFC. Motors for use with VFD's shall be inverter duty with inverter spike resistant wire.

d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.

e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.

f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.

7. Fan Selection:

a. Fan Curves: Performance curves shall be submitted for all units of 3000 CFM or greater. Operating point for forward curved fans shall be from point of maximum efficiency toward increased CFM limited by horsepower scheduled. Operating point for backward inclined fans shall be selected near point of maximum efficiency. Curves shall plot CFM verses static pressure with constant brake horsepower, RPM and efficiency lines.

b. Static Pressure: Unless otherwise noted, pressure scheduled as external static pressure (ESP) includes all ductwork and accessory losses external to the unit housing. Unless otherwise noted, pressure scheduled as total static pressure includes all ductwork, filter, coil, cabinet, damper and other accessory losses. Unless otherwise noted, pressure scheduled as duct static pressure includes all supply and return ductwork and accessory losses external to the unit housing and plenum (as applicable). The allowance for filter losses is 0.3" WC, unless otherwise noted. Submit itemized static pressure losses for all components.

8. Filters:

a. General: Tested and rated in accordance with ASHRAE Standard 52.2 and SFM 12-71-1, Part 12, Title 24, C.C.R. Furnish and install one complete change of all filters after air balance is completed and prior to acceptance. Provide pressure differential gage across all filter banks.

b. Filter Media: 2" media. MERV 8 or as scheduled. Clean filter resistance 0.10" water at 300 fpm. Throw-away frame. Class 2. Camfil Farr.

9. Screens: All duct or louver openings to the outside shall be covered with 1/4", 16-gage, galvanized wire mesh screen.

10. Mixing Dampers: Opposed blade, 16-gage. Six-inch maximum blade width, 48" maximum length. Nylon or oil impregnated bronze bearings. One-half inch diameter pin shaft. 16-gage channel frame. One percent maximum leakage at 4" WC in accordance with AMCA 500 for outside air dampers. Actuating rod out of air stream. Arrow.

11. Sound Ratings: Shall be in accordance with ASHRAE 36 - 72. Sound ratings shall not exceed scheduled values.

12. Drives: Unless noted as direct connected, drives shall be V-belt, rated at 150% of motor horsepower. Multiple drive belts shall be matched set. Drive sheaves shall be dynamically balanced, adjustable, range +/- 10%, selected at mid range. Adjustable relative movement shall be lockable to shaft. Belts shall be aligned within 1-1/2 degrees at all times. Open drives shall be provided with OSHA approved open mesh belt guards. Belt guards exposed to weather shall be weatherproof enclosure with louvered face for adequate ventilation. Driving motor shall be mounted on adjustable rails. T.B. Woods, Browning. Submit RPM range of driven machine with drive selection.

13. Vibration Isolation:

    a. General: The vibration isolation manufacturer shall be responsible for the proper selection of all isolators, support rails, and bases. Isolator selection shall be based on deflection as indicated. Lowest disturbing frequency shall be the basis for design. Isolator shall be selected for uniform deflection according to weight distribution. Shop drawings shall include a plan of equipment showing point loads, design data for each isolator including spring outside diameter, free, operating and solid heights, and ratio of horizontal to vertical stiffness, efficiency and design of support rails and bases. Consolidated Kinetics, Mason Industries, M.W. Sausse. All isolators shall be the product of a single manufacturer.

    b. Neoprene in Shear: 2500 psi tensile strength, oil resistant neoprene. Cast-in top and base plates. Isolator shall be selected for maximum static deflection without exceeding load capacity.

    c. Springs: Laterally stable steel springs. Horizontal stiffness equal to or greater than 1.3 times vertical stiffness. Outside spring diameter shall be a minimum of 0.8 times operating height. Springs shall be selected to provide operating static deflection plus a 50% overload capacity before reaching solid height. Spring shall be housed in a welded steel assembly designed and engineered to limit movement of supported equipment without degrading the vibration isolation during normal operating conditions. Base plate shall have a 1/4" thick ribbed neoprene pad. Assembly shall have a drilled and tapped load plate and leveling bolt. Static deflection shall be 2" unless otherwise noted. Isolator shall be designed in accordance with the CBC. Submit calculations to indicate compliance.

B. Air Conditioning Units:

1. General: Self-contained heating/cooling unit designed for outdoor installation. Factory assembled and tested. Refer to Paragraph 2.4A for general requirements. Provide all starters and relays required for operation. 24-volt control circuit from integral transformer. Weatherproof cabinet, galvanized steel with enamel finish. Fresh air inlet. Drain pan. Multivane centrifugal supply fan. Factory hold down devices. Coil guards as follows: 3/4"x1-3/4" 16 gage expanded galvanized steel, 18 gage galvanized steel frame, fully welded. ARI certified. Gas equipment AGA certified.

2. Refrigeration: Sealed hermetic compressor with internal vibration isolating mount.

Crankcase heater, high/low pressure switch, recycling timer. Air-cooled condenser with propeller fan. Non-ferrous finned coil. Low ambient control to 45ºF. Single phase units shall have compressor start assist kit. 5-year extended warranty on compressor(s).

3. Heat: Natural gas fired. Aluminized or ceramic coated welded steel heat exchanger. Electric ignition. Automatic gas valve. Fan and limit controls.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. General:

1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Engineer. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Lines shall be adequately braced against vertical and lateral movement. For piping connected to equipment mounted on springs, provide flex connections. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted. Pipe sizes shall not decrease in direction of flow, unless otherwise noted.

2. Joints:

a. Threaded: Pipe shall be cut square, and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.

b. Welded or Brazed: Welding and brazing shall conform to American Welding Society (AWS) standards. Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100ºF. Welding or brazing shall be performed by a Certified Welder or Brazer as certified by an organization/institution that uses standards recognized by the AWS and meets the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.

c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.

d. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards.

3. Pipe Support:

a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction.

Pipe Size (In.)	Maximum Spacing Between Supports (Ft.)*		
	Copper	Steel	Plastic
1/2	6	6	4
3/4	6	8	4
1	6	8	4
1-1/4	6	8	4
1-1/2	6	10	4
2	10	10	4
2-1/2	10	10	4
3	10	10	4
4	10	10	4

*Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves or other fittings. Plastic piping shall be supported per the manufacturer's recommendations. Seismic requirements may reduce maximum spacing.

b. Non-Insulated Piping: Support individual pipes with pipe hanger.

c. Refrigerant Piping: Support insulated refrigerant line with construction channel and sheet metal support saddle. 5' spacing. Use isolating shield for uninsulated pipe. When using pre-charged tubing, all changes of direction shall be made with bending tools producing neat uniform bends. Free hand bends will not be accepted.

d. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.

4. Miscellaneous:

a. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings, or floors in finished areas.

b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" (nominal) clearance between sleeve and pipe or pipe insulation. Piping through walls below grade shall be sealed with Link-Seal.

c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space

surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of the fire authority having jurisdiction.

d. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined, with the following exceptions: Bronze valves may be installed in ferrous piping without dielectric couplings. Do not install dielectric couplings at coil connections; provide red brass union in place of dielectric coupling.

B. Refrigerant Piping: Pipe shall be cut square. Joint surfaces shall be thoroughly cleaned, fitted and erected before brazing. After installation, evacuate to 29 inches of mercury, ambient temperature during evacuation shall not be less than 70°F. After evacuation, fill with dry nitrogen to 250 psi and maintain for two-hour period without additional charge. After nitrogen test, purge with refrigerant charged through dryer and maintain holding charge in system and equipment. Refrigerant piping below grade shall be run in 4" (min.) PVC conduit with long radius ells. Seal ends of conduit watertight.

3.2 PIPING INSULATION INSTALLATION

A. Refrigerant Piping: Cover piping with flexible elastomeric insulation in accordance with the recommendations of the refrigeration unit manufacturer. Longitudinal and end seams shall be thoroughly cemented with adhesive in accordance with manufacturer's recommendations. Cover all fittings, unions, valves and connections. Piping exposed to weather shall be covered with aluminum jacketing, seal all joints with outdoor mastic. Piping exposed to view, but not exposed to the weather shall be covered with PVC jackets.

3.3 DUCTWORK INSTALLATION

A. General:

1. Standards: Unless otherwise noted, all ductwork shall be constructed and installed in accordance with current SMACNA Standards. Ductwork shall be built to a pressure classification equal to or greater than the maximum operating pressure at that point in the ductwork. A copy of these standards shall be maintained at the job site at all times. Duct work and accessories shall be installed in a manner to prevent vibration and rattling.

2. Access: Provide duct access doors as required to adjust equipment and dampers. Provide wall or ceiling access panels, or remote actuators as required where equipment and dampers are not otherwise accessible. Duro Dyne SRC-120 concealed remote actuator with zinc finish on cover.

3. Flexible Connections: Connection of ductwork to any vibrating equipment shall be with 3" (min.) flexible connection. Install with ample slack and uniform gap. There shall be no metal to metal contact across flexible connection. Flexible connections exposed to weather shall have a protective sheet metal cover.

4. Flanges and Escutcheon: Where ductwork penetrates walls, ceilings, or floors, furnish and install flange or escutcheon of same material as duct.

5. Ductwork Passing through Fire Rated Surfaces: Where ductwork passes through

fire rated walls, floors, ceilings, partitions, etc., provide fire damper(s) or fire/smoke damper(s) in accordance with the requirements of the fire authority having jurisdiction.

B. Low Velocity-Low Pressure (up to 2,000 ft/min and up to 2.0 in water):

1. Sheet Metal Ductwork:

a. Ells: Ells with less than standard radius and square ells shall be fitted with turning vanes.

b. Tees: Tees in supply ductwork shall be straight tap-in with extractor or 45 degree take-off as shown on drawings. Duct mounted supply grilles shall be installed with an extractor. Grilles or branches in supply ductwork shall be a minimum of 8 duct diameters downstream of tees.

c. Duct Joints / Duct Sealants: Rectangular Ducts: Ducts shall be joined with duct joint connectors. Round Ducts: Ducts shall be joined with male-female slip joints and a minimum of three sheet metal screws. All joints and seams which are not exposed to weather shall be sealed airtight with fiber tape and liquid adhesive. Tape shall extend 1" on both sides of joints. All joints and seams exposed to weather shall be sealed air and water tight with G.E. "Silglaze II" silicone sealant. All joints on spiral wound metal ductwork not exposed to weather shall be sealed air tight with duct sealant.

d. Dampers: Install volume control damper and damper regulator in all branch ducts.

2. Flexible Glass Fiber Ductwork: The use of flexible duct is limited to the last 7 feet of each branch duct (i.e. one 7 foot section of flexible duct may be used to connect the grille to the sheet metal branch duct). No joints are permitted in this 7' length. Hangers shall be 4" wide metal straps spaced to prevent sagging, 42" spacing maximum. Insert 6" wide fiberglass pad between duct and hanging strap. Joints shall be installed with stainless steel or nylon draw bands, Duro Dyne Dyn-O-Tie. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius of duct centerline not less than 1.5 times the duct diameter).

3. Spiral Wound Metal Ductwork: At side duct grilles, the grille shall be cut directly into the spiral duct. Duct to duct joints shall be made with factory joint connectors and the spiral seam rotated so that the seam forms a continuous helical pattern across the joint.

4. Moisture Bearing Exhaust Ductwork: Exhaust ductwork bearing moisture such as exhaust ducts from showers, dishwashers, clothes driers, etc. shall be constructed of aluminum sheets. Joints shall be sealed watertight with mastic. Unless otherwise indicated, the ducts shall slope down towards the source of moisture (grille, hood, drier, etc.). Sheet metal screws or any other device that protrudes into the duct shall not be used for clothes drier exhaust ducts.

5. Flexible Glass Fiber Ductwork: Maximum allowable length is 7 feet; no joints are permitted in this length. Hangers shall be 4" wide metal straps spaced to prevent sagging, 42" spacing maximum. Insert 6" wide fiberglass pad between duct and

hanging straps. Joints shall be installed with a 3" (min.) overlap, sealed with duct sealant, and secured with a 1" wide, 18-gage galvanized sheet metal strap with 1/4" bolt fastener. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius of duct centerline not less than 1.5 times the duct diameter).

6. Underground Ductwork: Install ducts with constant slope up to grilles. All ducts and fittings shall be anchored to prevent floating as slab is poured. Any duct or fitting which is not protected with a polyvinyl chloride coating shall be encased in 3" (min.) concrete.

3.4 AIR TERMINALS AND DUCT FITTINGS INSTALLATION

A. General: Unless otherwise noted, all air terminals and duct fittings shall be installed in accordance with current SMACNA Standards. Terminals and fittings shall be installed in a manner to prevent vibration and rattling. Metal surfaces exposed to view behind grilles and registers shall be painted flat black.

B. Fire and Combination Fire/Smoke Damper: Shall be installed in accordance with the manufacturer's recommendations. Provide access doors as required. Manufacturer's instructions shall be available to the inspecting authorities. Shall be tested according to State Fire Marshal requirements.

3.5 DUCTWORK INSULATION INSTALLATION

A. General: Insulate all sheet metal supply and return ductwork except as noted below. Insulation shall be continuous through walls and floors except at fire dampers.

B. Where Insulation Is Not Required: Do not insulate factory-insulated ducts or casings, acoustic lined ducts, underground ductwork, supply or return ductwork exposed to view in the space that it serves, or exhaust ductwork.

C. Concealed Ductwork: Wrap concealed ductwork with fiberglass blanket lapped 6" minimum. Secure with staples 4" on centers maximum on straight runs and 3" maximum at elbows and fittings. Insulation on bottom of ducts wider than 36" shall also be secured with mechanical fasteners at 24" on center.

D. Acoustic Lining: Unless otherwise indicated, all supply and return ductwork in equipment rooms including outside air intakes, all ductwork exposed to weather and other ducts as indicated on drawings, shall have acoustic lining. Acoustic line all supply, return or exhaust duct connections to HVAC units or fans for a minimum of 10 lineal feet upstream and downstream of unit or fan, unless otherwise indicated on drawings. Do not acoustic line ductwork downstream of high efficiency filters. Where acoustic lining is installed, increase each sheet metal dimension to accommodate lining and maintain clear inside duct dimensions shown on drawings. Apply lining with adhesive in accordance with manufacturer's recommendations. For glass fiber lining, also secure with mechanical fasteners in accordance with SMACNA Standards and seal exposed edges of lining with anti-microbial edge treatment. Unless otherwise noted, lining shall be glass fiber.

E. Exposed Ductwork: All externally insulated ductwork which is exposed to view but protected from the weather shall be insulated with fiberglass board. Secure with mechanical fasteners at 12" on center. Reinforce all edges with corner angles and apply a finish coat of canvas or stretchable glass fabric and lagging adhesive.

F. Ductwork Exposed to Weather and Externally Insulated: Ductwork which is exposed to weather, but not internally insulated such as ductwork downstream of high efficiency filters or ductwork on combination evaporative cooled and heated air systems shall be externally insulated with fiberglass board. The fiberglass board shall then be protected with a galvanized sheet metal jacket per SMACNA standards.

3.6 EQUIPMENT INSTALLATION

A. General: It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block or otherwise hinder the equipment. All equipment shall be securely anchored in place. All equipment shall be installed level.

B. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.7 TESTS AND ADJUSTMENTS

A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Engineer. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested.

B. Piping Tests:

1. General: Tests may be made in sections, however, all connections between sections previously tested and new section must be included in the new test. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.

3.8 SYSTEM ENERGY BALANCE

A. Scope: Provide the services of an independent test and balance agency to test, adjust and balance, retest and record performance of the system to obtain design quantities as specified. The agency must prove that they have no affiliation with any equipment manufacturer, design engineer, installing contractor, or any other party which might lead to a conflict of interest, in order to provide an unbiased, third party system balance and report.

B. Qualifications: Prior to commencing work, the agency shall be reviewed by the Engineer and shall be certified by the Associated Air Balance Council or National Environmental Balancing Bureau. The agency shall provide documentation of having successfully completed at least five projects of similar size and scope. The Contractor must have sufficient personnel to respond to a trouble call at the site within two hours.

C. Instruments: All instruments shall be accurately calibrated; calibration histories shall be available for examination. Application of instrumentation shall be in accordance with AABC or NEBB standards.

D. Submittals: Include in shop drawings copies of forms to be used for testing and balancing

showing all data which is to be recorded. Three copies of completed balance report shall be submitted for review.

E. Procedure - General: Procedure shall be in accordance with Associated Air Balance Council's "National Standards for Field Measurements and Instrumentation - Total System Balance", Volume Two, No. 12173, or equivalent NEBB standards. System shall be in full, continuous operation during test. Balanced quantities shall be plus 10%, minus 0% of design quantities. All nameplate data, manufacturer, model and serial numbers shall be recorded for each item tested.

F. Extended Warranty: The test and balance agency shall include an extended warranty of 90 days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck or resetting of any item or items in test report. The agency shall provide technicians to assist the Engineer in making any tests he may require during this period of time.

G. Air Balance Procedure (For Each Air Handling System):

1. All air filters shall be clean when air balance is performed.
2. Provide a sketch of the equipment showing exactly where all pressure readings were taken.
3. Adjust blower RPM to design requirements.
4. Record motor full load amperes.
5. Make pitot tube traverse of main supply and return ducts and obtain design CFM at fans.
6. Record system static pressures, inlet and discharge.
7. Record filter quantity, size(s) and pressure drop across filter(s) at each filter bank.
8. Adjust system for design CFM recirculated air.
9. Adjust system for design CFM outside air.
10. Adjust all main supply and return air ducts to design CFM.
11. Adjust all zones to design CFM, supply and return.
12. Adjust all diffusers, grilles and registers to plus 10%, minus 0% of design requirements.
13. Adjust CFM at all exhaust fans, make-up units, etc. (high and low speed, where applicable). Record applicable data from items above.
14. Each grille, diffuser and register shall be identified as to location.
15. Verify proper diffusion pattern for all ceiling grilles and that all sidewall grilles are set for 5 degrees upward deflection unless otherwise noted. Make a notation of any that are not set properly.
16. Size, type and manufacturer of diffusers, grilles, registers and all tested items shall be identified and listed. Manufacturer's ratings shall be used to make required calculations on all items.
17. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
18. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
19. All diffusers, grilles and registers shall be adjusted for required air patterns and to minimize drafts.

20. As a part of the work of this contract, the air conditioning contractor shall make any changes in pulleys, belts and dampers or the addition of dampers required for correct balance as recommended by air balance agency, at no additional cost to Owner.

END OF SECTION

SECTION 23 08 50

VARIABLE REFRIGERANT FLOW

Part 1 – General

1.1 SUMMARY

A. The HVAC basis of design shall be Trane 4TVR Air Source Heat Recovery VRF as scheduled.

B. Bidders shall provide the minimum system as indicated on drawing, including Heat Recovery systems as defined by model numbers. All systems shall be capable of providing the scheduled capacity at the location of the indoor unit regardless of pipe length. Nominal or catalog capacities will not be accepted.

C. Heat Recovery systems shall be capable of simultaneous cooling and heating. The Heat Recovery system shall consist of Trane Air Source unit(s), MCU(s) (Mode Change Unit), multiple Trane indoor units and Trane VRF System Controls.

D. The Heat Recovery system shall be capable of transferring heat between individual indoor units, and between individual Mode Control Units.

E. The Heat Recovery system shall be a Hybrid Three Pipe system to ensure maximum Simultaneous Cooling and Heating Efficiencies (SCHE). Heat Recovery outdoor units will feature a low temperature/low pressure gas line, high temperature/high pressure gas line, and a medium temperature/high pressure liquid line. All three lines will connect from the outdoor unit to each mode control units.

F. To ensure maximum occupant comfort, Heat Recovery systems will have a space temperature controller for each connected indoor unit. Each individual space temperature controller shall be capable of automatically satisfying heating or cooling regardless of time of day, occupancy, or season without inhibiting or affecting other space temperature controllers.

G. BAS System Controls, installation, and integration shall be provided by the manufacturer of the VRF system. This is to ensure sole source responsibility for the BAS control system including non-VRF systems.

1.2 QUALITY ASSURANCE

A. System efficiencies (IEER and SCHE) for units greater than 65,000 BTUH shall be certified by AHRI standard 1230, and shall be published for public review at www.ahrinet.org. Equipment that is "rated" in accordance with AHRI Standard 1230, but not published for public review by AHRI shall not be accepted.

B. The units shall be listed by Electrical Laboratories (ETL) and bear the ETL label.

C. All wiring shall be in accordance with the National Electrical Code (N.E.C.).

D. Project shall comply with the applicable version of ASHRAE standard 15.

E. Project shall comply with the applicable version of ASHRAE 90.1

F. The VRF manufacturing facility shall be registered to ISO 9001 and ISO14001.

G. All components shall be provided by one manufacturer including but not limited to:

1) Outdoor Units
2) Indoor Units
3) Mode Control Units
4) All necessary and applicable controls for the VRF System
5) Factory refrigerant charge for outdoor unit(s)
6) Factory Y and or T-Branch(s)
7) Condensate Lift Pump(s)
8) Refrigerant Ball Valves
9) Service Software

1.3 DELIVERY, STORAGE AND HANDLING

A. Installing contractor will take all reasonable and appropriate care to store and handle equipment per the manufacturer's recommendation.

1.4 SUBMITTALS

A. Installing contractor shall provide the following:

1) Trane VRF Guide Specification
2) Trane VRF Dimensional Data for all products submitted
3) Trane VRF Product Data for all products submitted.
4) Trane VRF Select report showing design conditions, total load profile, and actual capacity at actual Indoor Unit location,
5) Trane VRF Select Piping and Wiring layout showing estimated piping, wiring sizes, equipment quantities, piping length estimate, and additional refrigerant charge.
6) Trane VRF Select Schedule showing the performance for all pieces of equipment.

1.5 INSTALLATION AND OPERATION MANUALS

A. Owner shall be provided with a complete and comprehensive electronic set of Installation and Operation Manuals.

1.6 QUALIFICATIONS

A. Manufacturer shall have a minimum of twenty-five (25) years of HVAC experience in the North America market.

B. Manufacturer to have Local Factory Service within seventy-five (75) miles of jobsite.

C. The Trane VRF system shall be installed by a Trane certified installer with extensive Trane VRF installation and service training. The mandatory contractor service and install training shall be performed by the manufacturer.

1.7 WARRANTY

A. The units shall carry a manufacturer's parts and compressor warranty for a period of 10 years from date of installation. The following steps shall be taken by the contractor to ensure systems are eligible for warranty.

1) System is designed and submitted using the approved application tool (Trane VRF Select).
2) System installed by a contractor who has successfully completed the Trane factory training class.
3) Upon completion of installation and prior to final commissioning, contractor shall provide revised piping layout reflecting actual installation conditions to Trane VRF technician for submittal to Trane Factory Service Department.
4) Provide a verified and submitted commissioning report to Trane Factory Service Department.

B. The units shall be covered by the manufacturer's labor warranty for a period of 1 year from the date of startup. The following steps shall be taken by the contractor to ensure systems are eligible for extended labor warranty.

Part 2 – Products

2.1 MANUFACTURERS

A. Basis of design is Trane VRF.

2.2 OUTDOOR UNITS

A. The Trane 4TVR Heat Recovery Air Source unit shall be used specifically with Trane Heat Recovery systems (simultaneous heating and cooling). Units shall have weather tight construction for outdoor installation, (outdoor unit).

B. The Heat Recovery system shall provide simultaneous heating and cooling without the use of reheat.

C. In order to ensure maximum Simultaneous Cooling and Heating Efficiencies (SCHE), Heat Recovery outdoor units will feature a low temperature/low pressure gas line, high temperature/high pressure gas line, and a medium temperature/high pressure liquid line. All three lines will connect from the outdoor unit to each mode control units.

D. The Trane Heat Recovery outdoor units shall be equipped with multiple circuit boards. These boards shall perform all functions necessary for operation of the outdoor units.

E. The outdoor unit shall be completely factory assembled, internally piped and wired. Each unit shall be run tested at the factory.

1) The combination ratio of the nominal indoor cooling capacity versus the nominal outdoor rated cooling capacity shall range from 50% to 131%.
2) Outdoor unit shall have a sound rating no higher than 62/83(Pressure/Power) dB(A).
3) Unit shall have a night quiet setting to reduce nighttime sound levels.
4) All refrigerant lines from the outdoor unit to the MCU (Mode Change Unit), and or from MCUs to IDUs (Indoor Units,) shall be field insulated with a minimum insulation as referenced in the Trane VRF IOM (VRF-SVN034A-EN) Table 27, "Pipe insulation selector."

5) The outdoor unit shall have an accumulator with crank case heater and controls.
6) The outdoor unit shall have a high pressure safety switch, fuse, over-current protection and crank case heater.
7) If the outdoor unit is above the indoor unit, the outdoor unit shall have the ability to operate with a maximum height difference of 361ft. If the indoor unit requirement is greater than 164 ft, contact your local Trane Sales Office.
8) If the outdoor unit is below the indoor unit, the outdoor unit shall have the ability to operate with a maximum height difference of 131 ft.
9) The system shall have a maximum total refrigerant tubing length of 3281ft.
10) The maximum length between outdoor unit and the furthest indoor units is not to exceed 656 ft (722 equivalent feet).
11) The maximum height difference between MCU boxes shall be 49 ft.
12) The maximum height difference between indoor units shall be 49 ft.
13) The outdoor unit shall be capable of operating in cooling mode from 23°F to 120°F.
14) The outdoor unit shall be capable of operating from 23°F to 5°F if the system is installed and configured per manufacturers guidelines.
15) The outdoor unit shall be capable of operating in heating mode from 75°F to -13°F ambient temperatures without additional low ambient controls, additional modules, or low ambient accessories.
16) The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.
17) The outdoor units shall provide continuous heating during oil return and the defrost cycle through the use of rotational defrost. (multiple module systems)

F. The unit casing(s) shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

G. The outdoor condenser fan shall be furnished with direct drive motors(s). All fan motors shall have inherent motor protection, and permanently lubricated bearings. All fan motors shall be mounted for quiet operation. All fans shall be provided with a raised guard to prevent contact with moving parts. The fans shall have vertical discharge airflow.

H. R410A refrigerant shall be required for Trane VRF outdoor unit systems.

I. System shall use Polyvinylether (PVE) oil. Due to the increased risk of hydrolysis and formation of acids, Polyolester (POE) oil shall not be acceptable.

J. The outdoor condenser coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing. The condenser coil shall have Blue Fin anti-corrosion protection as a standard feature. The coil shall be protected with an integral metal guard. The coil fins shall be coated with hydrophilic paints. Coil shall be capable of withstanding 1000 hour salt spray test.

K. The outdoor units shall be equipped with inverter driven vapor injection asymmetric scroll compressor(s). The asymmetric design will allow for only one point of contact for the scroll compressor blades resulting in reduced friction, and increased efficiency. Conventional scroll compressors with 2-points of contact will not be allowed due to their inherent inefficiency.

1) The outdoor unit compressor shall utilize inverter driven technology to modulate capacity. The compressors shall also utilize advanced technology adaptive sine wave control for reduced harmonics and faster frequency acceleration.
2) The compressor shall be capable of $1/60^{th}$ second advanced micro-control.
3) The outdoor unit compressor shall utilize vapor injection technology which shall increase the mass flow rate of refrigerant, resulting in improved performance for low temperature conditions.

4) The compressor will be equipped with an internal thermal overload protection.
5) The compressor shall be mounted to avoid the transmission of vibrations.

L. Use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire for communications wiring. Splicing of communication wiring shall not be permitted.

2.3 MCU (Mode Change Unit)

A. The Trane MCU (Mode Change Unit) shall be used for applications requiring simultaneous heating and cooling. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.

B. MCUs require they be used in conjunction with Trane VRF Heat Recovery air source units. These units shall be equipped with a circuit board that shall perform all functions necessary for operation.

C. The MCU (Mode Change Unit) shall be completely factory assembled, internally piped and wired. Unit shall be run tested. This unit shall be mounted indoors.

D. Each MCU shall be capable of transferring heat to connected associated indoor units, and to the connected to each air source unit. This shall allow simultaneous heating and cooling without the need for reheat.

E. Isolation valves with access ports shall be installed by the contractor on the entering and leaving refrigerant circuits.

F. Additional subcooling shall be provided at the MCU. The additional subcooling shall mitigate losses due to pipe length and heat gain, and ensure scheduled capacity at the indoor unit.

G. MCU (Mode Change Units) shall be available in three sizes, 4-port, 6-port, and dedicated 2-port. The heat recovery water source or air source unit shall be capable of connecting to multiple MCUs (Mode Change Units).

H. The 4-port MCU shall connect up to 4 indoor units when the sum of the indoor unit's capacity is less than 120 MBH. Optionally, the 6-port MCUs shall connect up to 6 indoor units where the sum of indoor unit's capacity is less than 180 MBH.

I. The MCU casing shall be fabricated of galvanized steel. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves. The unit shall house two tube-in-tube heat exchangers (sub cooling) to ensure heating and cooling capacity at the indoor unit.

J. The MCU shall have a removable panel and shall not be insulated for ease of service.

K. The MCU shall be furnished with multiple two position refrigerant valves. Linear electronic expansion valves shall be used to control the variable refrigerant flow.

L. An integral MCU condensate pan and drain connection shall be provided.

M. Use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire for communications wiring. Splicing of communication wiring shall not be permitted.

2.4 1-WAY CEILING CASSETTE INDOOR UNITS

A. The 4TVE is a one-way cassette style indoor unit that recesses into the ceiling with a ceiling grille and shall have a 2000 step modulating expansion device.

B. The unit electrical power shall be 208-230 volts, 1-phase, 60 hertz.

C. The indoor unit shall be a factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, the electronic modulating linear expansion device, control circuit board, and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and auto restart function. The unit shall be provided with a face mounted infrared receiver for use with a handheld wireless remote controller. The unit shall have an integral return air sensor.

D. The unit cabinet shall be space-saving ceiling recessed. The one-way grille shall be fixed to bottom of cabinet allowing for one-way airflow.

E. The indoor fan shall consist of a direct driven cross-flow fan with a single motor. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings. The indoor fan shall have high, medium, and low fan speeds. The fan speed shall be adjustable by a remote controller.

F. Return air shall be filtered by means of a long-life washable permanent filter.

G. The indoor coil shall be constructed as follows:

1) The indoor coil shall be of nonferrous construction with slit fins on copper tubing.
2) The tubing shall have inner grooves for high efficiency heat exchange.
3) All tube joints shall be brazed with phos-copper or silver alloy.
4) The coils shall be pressure tested at the factory.
5) A condensate pan and drain shall be provided under the coil.
6) The factory installed condensate lift pump mechanism shall be able to raise drain water 29.5 inches water column above the condensate pan.
7) The coil fins shall be coated with hydrophilic paints.
8) Both refrigerant lines to the indoor units shall be insulated.

H. Use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire for communications wiring. Splicing of communication wiring shall not be permitted.

I. This unit shall use controls provided by Trane to perform functions necessary to operate the system. Refer to Part 3 of this guide specification for details on controllers and other control options.

2.5 4-WAY CEILING CASSETTE INDOOR UNITS

A. The Trane 4TVB/4TVC is a four-way cassette style indoor unit that recess into the ceiling grid with an exposed ceiling grille and an integral 2000 step modulating expansion device.

B. The unit electrical power shall be 208-230 volts, 1-phase, 60 hertz.

C. The indoor unit shall be a factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, the electronic modulating linear expansion device, control circuit board, and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function. The unit shall have an integral return air sensor.

D. The unit cabinet shall be a space-saving ceiling-recessed cassette.

E. The unit shall have a sub-duct punch out for conditioning of sub spaces.

F. The unit shall have an outside air punch out.

G. The indoor fan shall consist of a turbo fan with a single direct drive motor. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings. The indoor fan shall have high, medium, and low fan speeds. The fan speed shall be adjustable by an optional remote controller.

H. The auto air swing vanes shall be capable of automatically swinging up and down for uniform air distribution.

I. If required, the cassette shall be capable of closing off one or more vanes to prevent "stray air-flow".

J. Return air shall be filtered by means of a long-life washable permanent filter accessible from bottom of unit.

K. The indoor coil shall be constructed as follows:

1) The indoor coil shall be of nonferrous construction with slit fins on copper tubing.
2) The tubing shall have inner grooves for high efficiency heat exchange.
3) All tube joints shall be brazed with phos-copper or silver alloy.
4) The coils shall be pressure tested at the factory.
5) A condensate pan and drain shall be provided under the coil.
6) The coil fins shall be coated with hydrophilic paints.
7) The factory installed condensate lift pump mechanism shall be able to raise drain water 29.5 inches water column above the condensate pan.
8) Both refrigerant lines to the indoor units shall be insulated.

L. Use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire for communications wiring. Splicing of communication wiring shall not be permitted.

M. This unit shall use controls provided by Trane to perform functions necessary to operate the system. Refer to Part 3 of this guide specification for details on controllers and other control options.

2.6 MEDIUM STATIC/ HIGH STATIC - DUCTED INDOOR UNITS

A. The Trane 4TVD/4TVA are ducted indoor fan coil designs that mounts above the ceiling. The unit shall have a 2000 step modulating expansion device.

B. The unit electrical power shall be 208-230 volts, 1-phase, 60 hertz.

C. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, the electronic modulating linear expansion device, control circuit board, and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. The unit shall have integral return air sensor, integral discharge air sensor, and integral contacts to interface with an external auxiliary heat source.

D. The unit cabinet shall be a space saving, ceiling-concealed, ducted unit. The cabinet panel shall have provisions for a field installed filtered outside air intake.

E. The indoor unit fan shall consist of two or three Sirocco fans, direct driven by a single motor. The indoor fan shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings. The indoor fan shall have high, medium, and low fan speeds. The fan speed shall be adjustable by a remote controller.

F. The indoor coil shall be constructed as follows:

1) The indoor coil shall be of nonferrous construction with slit fins on copper tubing.
2) The tubing shall have inner grooves for high efficiency heat exchange.
3) All tube joints shall be brazed with phos-copper or silver alloy.
4) The coils shall be pressure tested at the factory.
5) A condensate pan and drain shall be provided under the coil.
6) The coil fins shall be coated with hydrophilic paints.
7) The field installed condensate lift pump mechanism shall be able to raise drain water 29.5 inches water column above the condensate pan.
8) Both refrigerant lines to the indoor units shall be insulated.

G. Use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire for communications wiring. Splicing of communication wiring shall not be permitted.

H. This unit shall use controls provided by Trane to perform functions necessary to operate the system. Refer to Part 3 of this guide specification for details on controllers and other control options.

2.7 ACCESSORIES

A. Y-Joint Kits- are a required component for Trane VRF-Systems with multiple evaporators or MCU's on the same system. Y-joints shall be provided for liquid, suction, and hot gas fittings as required. Y-joints shall be provided with polystyrene insulation. Y-branches shall facilitate different pipe sizes without having to braze additional fittings. Field fabrication or substitution of non-Trane Y-Joints shall void warranty. Kits shall be installed per manufacturer guidelines.

B. Refrigerant Isolation Ball Valves - shall be provided for field installation downstream of Y-Joints and downstream of each MCU. Valves shall utilize a uni-body full port design to minimize leaks and internal pressure drops. Valves shall be rated for 700PSIG, and shall include a factory insulation package. Valves shall be factory tested under pressure. Valves shall require polytetrafluroethylene (PTFE) seals and gaskets. No synthetic O-rings are allowed. Design shall permit valve operation without removal of seal cap. Valves shall have a temperature operation range of -40°F to 300°F. Valves shall be flare fittings for ease of installation. Valves shall be provided with formed and fitted insulated jacket. Requires field installation.

C. A simple Touch Remote Controller can be used with all Trane VRF Indoor Units. Touchscreen shall be capacitive touchscreen. Remote shall utilize an intuitive touchscreen multi-function LCD display.

D. External Contact Interface shall permit the on/off control of indoor units through an external input. The device will also allow the indoor unit to interlock control of external devices. This will allow the external devices to operate in sequence with the interlocked indoor unit.

E. Standard cassette panels shall be provided with all 1-way and 4-way ceiling cassettes.

2.8 WALL MOUNTED INDOOR UNITS

A. The Trane 4TVW-C is a wall-mounted indoor unit section. The wall mounted indoor unit electrical power shall be 208-230 volts, 1-phase, 60 hertz. The 4TVW-C shall have a 2000 step modulating expansion device.

B. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, internal piping, the electronic modulating linear expansion device, control circuit board, and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and auto restart function. The unit shall have an integral return air sensor.

C. The indoor fan shall consist of a cross-flow fan with a single direct drive motor. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings. A manual adjustable guide vane shall be provided to change the airflow from side to side (left to right) as desired. A motorized air sweep louver shall provide an automatic change in airflow by directing the air up and down to provide uniform air distribution. The indoor fan shall have multiple speeds.

D. Return air shall be filtered by means of an easily removable, washable filter.

E. The indoor coil shall be constructed as follows:
   1) The indoor coil shall be of nonferrous construction with slit fins on copper tubing.
   2) The tubing shall have inner grooves for high efficiency heat exchange.
   3) All tube joints shall be brazed with phos-copper or silver alloy.
   4) The coils shall be pressure tested at the factory.
   5) A condensate pan and drain shall be provided under the coil.
   6) The coil fins shall be coated with hydrophilic paints.
   7) The field installed condensate lift mechanism shall be able to raise water 29.5 inches water column above the condensate pan.
   8) Both refrigerant lines to the indoor units shall be insulated.

F. Use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire for communications wiring. Splicing of communication wiring shall not be permitted.

G. This unit shall use controls provided by Trane to perform functions necessary to operate the system. Refer to Part 3 of this guide specification for details on controllers and other control options.

Part 3 – Controls

3.1 EMS MANUFACTURER

A. The Trane VRF System Network Controls shall be capable of supporting remote controllers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to EMS via BACnet®.

3.2 ELECTRICAL CHARACTERISTICS

A. The Trane VRF System Network Controls shall operate at 12VDC. Controller power and communications shall be via a common non-polar communications bus.

B. Control wiring shall be installed in a system daisy chain configuration from the wired remote controller to the indoor unit, to the and to outdoor unit. Control wiring to wired remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.

C. Control wiring for system controllers, and centralized controllers shall be installed in a daisy chain configuration from interface module to interface module, to system controllers, to the power supply.

D. For communication wiring between ODUs, IDUs, MCU, system controller, and remote controllers use 18 AWG, 25pF/ft nom., 60.7 Ω impedance, braid or foil shielded, twisted pair wire. Splicing of communication wiring shall not be permitted.

E. The Trane VRF SC Web UI shall be capable of being networked with the VRF System Controller TVCTRLTIMD00A0, system controllers for web based control.

F. Network wiring shall be CAT-5e with RJ-45 connection.

3.3 SYSTEM NETWORK CONTROLS

A. The Trane VRF System Network Controls consists of individual controllers, system controllers, and integrated management system. The Trane VRF System Network Controls shall support operation monitoring, scheduling, error monitor, power distribution, online maintenance support, and integration with EMS using BACnet® interfaces.

3.4 VRF-SYSTEM CONTROLLER+BACnet®

A. The VRF System Controller+BACnet is an intelligent field panel that communicates with VRF Outdoor Unit(s), Indoor Unit(s) and other Trane VRF controllers. Additionally, it shall include a BACnet® IP (Internet Protocol) port to function as a communications gateway to other BACnet IP devices, such as Trane's Tracer SC. The VRF System Controller+BACnet shall connect to associated indoor and outdoor units utilizing a dedicated control network. The controller utilizes the local area network (LAN) to provide a web page-based user interface available wherever the building's network access is available. The VRF System Controller+BACnet is housed in a protective enclosure suitable for wall-mounting in a mechanical or electrical equipment room. The Trane VRF BACnet® Gateway shall be capable of controlling up to 256 indoor units/EEVs support.

B. The VRF System Controller shall allow a building operator to view the system using a PC with a standard web browser, such as Windows® Internet Explorer or Mozilla Firefox.

C. The VRF System Controller shall include a user interface that includes control and monitoring of each Indoor unit through a standard graphical display with convenient pop-up controller screen to adjust comfort settings for each zone.

D. The VRF SC shall be capable of controlling a maximum of 256 indoor units via a PC. The VRF SC shall support operation superseding that of the remote controllers, system configuration, 1-day/daily/weekly scheduling, monitoring of operation status, error email notification, online maintenance tool and malfunction monitoring.

E. The VRF SC shall have a basic set of operation controls which can be applied to an individual indoor unit, a group of indoor units (up to 256 indoor units), or all indoor units (collective batch operation).

F. The basic set of operation controls for the VRF SC shall include on/off, operation mode selection (auto, cool, heat, dry, and fan), temperature setting, fan speed setting, airflow direction setting, error email notification, and online maintenance.

G. Since the VRF SC provides centralized control, it shall be able to enable or disable operation of local remote controllers via the PC. In terms of scheduling, the VRF SC shall allow the user to define 1-day, daily, and annual schedules with operations consisting of ON/OFF, mode selection, temperature setting, permit/prohibit of wireless/wired remote controllers.

H. The system shall detect and store alarms in the Alarm Log. The Alarm Log shall display critical data about the alarm, including the location of the device, and the time of occurrence. Alarms shall be routed by e-mail to stationary or mobile devices. Capacity to store up to 1024 alarm events on time specific basis shall be required.

I. Database changes made by other users shall automatically be reflected in the VRF System Controller without the need for a central server. The system database be capable of archiving or backing up data for local or offsite storage. This is desirable in the event the date is ever needed for restoring the system. A built-in SD card slot provides for on-board but removable data backup storage.

J. A password shall protect the VRF control system from unauthorized access. Each operator is assigned a role. Roles are defined by access rights. Pre-defined roles shall be selected from the VRF System Controller interface. Operators shall have access only to those features which define their roles. Roles may also be customized. An operator with administrative-level security shall access all information on the system, and shall have the ability to alter passwords and create new security roles.

Trane VRF System Controller+BACnet®

Item	Description	Operation	Display
ON/OFF	Start stop operation for a single group	Each Group	Each Group
Operation Mode	Changes mode between Auto/Cool/Dry/Fan/Heat	Each Group	Each Group
Temperature Setting	Sets the temperature for a single group. Range of temperature settings: Auto/Cool/Dry: 64°F-86°F (18°C-30°C), Heat: 61°F-86°F (16°C-30°C)	Each Group	Each Group
Fan Speed Setting	Models with 3 air flow settings: High/Mid/Low	Each Group	Each Group
Air Flow Direction Setting	Air flow 2-step direction (Swing/Stop). Direct settings at a specific angle. Air flow operation varies depending on the model.	Each Group	Each Group
Web Server Function	Remote control with the public IP address. No management software required – PC-independent management	Each Group	Each Group
Accessible level/ Dynamic user security	Wireless/wired remote controller restriction setting Specifies the scope of control and monitoring unit on a per-user 3 accessible levels -	Each Group	Each Group

Trane VRF System Controller+BACnet®			
Item	**Description**	**Operation**	**Display**
Management	Admin/Manager/User		
Error	When an error is occurs on an outdoor unit, the affected unit and error code are displayed	Each Group	Each Group
Schedule Operation	Up to 256 schedule settings including weekly and daily schedule setting	Each Group	Each Group
External Contact Interface	Full indoor unit control with simple contact input (Emergency/Lock) State output (Operation/Error) for synchronous control. 6 digital outputs / 8 digital inputs	Each Channel	Each Channel
Smart Central Management	Control & monitoring zone edition. Wireless/wired remote control restriction. Temperature limit setting Operation mode restriction. Silent control setting	Each Group	Each Group
User editable control logic	User can edit control logic with arithmetic/conditional operators and parameters. Efficient energy saving realization based on various operation conditions.	Each Group	Each Group
Data back-up/ Useful history management	Important data is safely stored in SD memory card Record the operation history and error history	Each Group	Each Group
Multi language	English, Korean, Chinese, Spanish, Italian, Portuguese, Dutch, Hungarian, Polish, Russian		

Indoor Unit BACnet® Point List								
In-stance Number	**Object**	**Ob-ject Type**	**Object Name**	**Unit Inac-tive Text-1**	**Text-2**	**Text-3**	**Text-4**	**Text-5**
1	Indoor Tempera-ture	AI	AC_RoomTemp_xx_xxxxx	°C				
2	Set Tem-perature	AV	AC_Temp_Set_xx_xxxxx	°C				
3	Setting low-er tempera-ture limit	AV	AC_Cool_Limit-Temp_xx_xxxxx	°C				
4	Setting up-per tem-perature limit	AV	AC_Heat_Limit-Temp_xx_xxxxx	°C				
5	IDU power usage after the basic date	AI	AC_Baseline_kWh_xx_xxxxx	kWh				
6	IDU hour usage after the basic date	AI	AC_Baseline_Minute_xx_xxxxx	Minute				
7	Power val-ue within period	AI	AC_Period_KWh_xx_xxxxx	kWh				
8	IDU hour usage with-in period	AI	AC_Period_Minute_xx_xxxxx	Minute				
9	Power On/Off	BV	AC_Power_xx_xxxxx	Off	On			
10	Applying lower tem-perature limit setting	BV	AC_Cool_Limit_set_xx_xxxxx	False	True			
11	Applying upper limit tempera-	BV	AC_Heat_Limit_set_xx_xxxxx	False	True			

Indoor Unit BACnet® Point List								
	ture setting							
12	Filter sign status	BI	AC_FilterSign_xx_xxxx	False	True			
13	Filter sign reset	BO	AC_FilterSign_Reset_xx_xxxxx	False	True			
14	Operation mode status	MV	AC_Operation_Mode_xx_xxxxx	Auto	Cool	Heat	Fan	Dry
15	Fan speed status	MV	AC_FanSpeed_xx_xxxxx	Auto	Low	Mid	High	
16	Airflow direction status	MV	AC_FanFlow_xx_xxxxx	None	Vertical	Horizon	All	
17	Operatiom mode limit status	MV	AC_Mode_Limit_xx_xxxxx	No Limit	Cool Only	Heat Only		
18	Remote controller limit status	MV	AC_Remocon_xx_xxxxx	Enable RC	Disable RC	Conditional RC		
19	Integrated error code of both indoor unit and outdoor unit	AI	AC_Error_Code_xx_xxxxx	Refer to List of Error Codes				

Outdoor Unit BACnet® Point List								
In-stance Number	**Object**	**Ob-ject Type**	**Object Name**	**Unit Inac-tive Text-1**	**Text-2**	**Text-3**	**Text-4**	**Text-5**
1	Outside Tempera-ture	AI	ODU_Outside_Temp_xx_xxxxx	°C				
2	Setting up-per tem-perature limit	BI	AC_Heat_Limit-Temp_xx_xxxx	False	True			
3	Compressor Status	AI	ODU_Comp_Status_xx_xxxxx	Refer to the list of the integrated error codes				
4	Interface module no-tify	NC	IM_Notify_xx_xxxx	When the error occurred, send event to list of destination in the recipient list. (Max:8)				

Part 4 – Execution

4.0 INSTALLATION

A. System shall be installed in accordance with manufacturer's guidelines.

B. Installing contractor shall attend and successfully complete the Trane VRF Installation factory training class before beginning installation. Contractor shall submit certificate of completion.

C. Installing contractor shall install units to comply with all applicable building codes.

D. Trane VRF systems shall be installed in such a way as to permit access for routine maintenance.

4.1 COMMISSIONING

A. Upon completion of installation and prior to final commissioning, contractor shall provide revised piping layout reflecting actual installation conditions to Trane VRF technician.

B. The system shall then be reviewed and commissioned by a Trane Factory VRF Technician. Contractor shall provide a verified and submitted commissioning report to Trane Factory Service Department, and to the owner's agent verifying the system has met the requirements for proper installation, and function.

C. A Trane Factory Certified VRF Technician shall train owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION

SECTION 25 09 00

ENERGY MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The preceding General Mechanical Provisions shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE

A. Included: Provide all labor, materials and services necessary for a complete, lawful and operating energy management system (EMS) system as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:

1. Control panels, control devices, line and low voltage wiring, conduit and related equipment as required for proper operation of all controlled systems.

2. Power wiring required for control devices such as actuators, controllers, sensors and power supplies. Power wiring for these devices shall be fed from circuits dedicated to the EMS system.

B. Work Specified Elsewhere:

1. Line voltage dedicated power circuits for stand-alone building controllers are included in the electrical divisions unless otherwise noted. Power wiring required for fire or smoke dampers is included in the electrical divisions.

1.3 CONTRACTOR QUALIFICATIONS

A. All controls shall be furnished and installed by a Contractor who is licensed, certified or contracted by the controls manufacturer for design, installation, start-up and service of their product. The Contractor must have factory supplied training and support. The Contractor shall have sufficient personnel to respond to a trouble call at the site within four hours. The Contractor's local manager shall have a minimum of five years experience in the design, installation, start-up and service of similar systems.

1.4 BASIS OF DESIGN

A. This specification is based on Johnson Metasys, without substitution.

1.5 SUBMITTALS AND OPERATION AND MAINTENANCE MANUALS

A. Submittals shall be in accordance with Section 20 01 00 and shall include the following:

1. Contractor qualifications. Manufacturer licenses, contracts or certifications for the installer shall be submitted on manufacturer's letterhead.

2. Manufacturer's data for all devices.

3. Manufacturer's data for all software.

4. Diagrams showing control schematics. Diagrams shall include all sensors, terminal strips, panels and control devices. Locations of all devices shall be indicated.

5. Sequence of operation.

B. Operation and Maintenance Manuals: Furnish Operation and Maintenance Manuals for all components. These manuals shall contain full documentation which shall include, without being limited to, the following:

1. General description and specifications.

2. Installation and initial checkout procedures.

3. Complete trouble-shooting procedures and diagrams.

4. Complete alignment and calibration procedures for all components.

5. Preventative maintenance requirements.

6. Detailed schematics and assembly drawings.

1.6 SYSTEM ARCHITECTURE

A. The energy management system shall employ a multi-level distributed processing architecture. A web based front end controller shall act as the host and shall communicate with both the system operator and the stand-alone controllers. The stand-alone controllers shall be microprocessor based and perform the specified data acquisition and control functions. They shall connect to and supervise multiple application specific controllers (ASC). The stand-alone controllers shall perform stand-alone control functions whether in communications with the web based front end controller or not. All independent control loops shall be processed and controlled by the stand-alone controllers. Each stand-alone controller shall store historical data for all connected points for a minimum of 24 hours. Historical data shall include total run-time for each digital point. For analog data, periodic samples shall be stored at the frequency of once per minute. The physical connection and interface with the actual field points shall be accomplished through the ASC's. The ASC's shall be located throughout the data environment, communicate with, and be controlled by the stand-alone controllers. The stand-alone controllers shall be accessible by laptop computer with proper software via cable connection. Access to the system shall also be available through connection at selected space sensors.

PART 2 - PRODUCTS

2.1 SENSORS

A. Space Temperature Sensor: Room sensor with occupant adjustable set point and bypass button. Occupant adjustable set point shall be limited by software. Wall mounted temperature sensors shall be mounted with bottom of sensor at 48" above finish floor.

B. Outside Air Temperature Sensor: Provide one outside air sensor. Install on north wall of building.

C. Duct Sensor: Averaging sensor shall be used at ducts with greater than 9 square feet of cross sectional area. Sensor shall extend across 75% of the duct. Sensor shall be housed in a NEMA 1 enclosure (inside) or a NEMA 3R enclosure (outside) with proper extension at insulated ducts. Provide access door.

D. Status Sensor: Current sensing status sensor with sensitivity adjustment.

E. Smoke Detector: Photoelectric type, 115 VAC. The detector shall operate at air velocities from 300 FPM to 4000 FPM. The detector head shall not require additional filters or screens. Mounted in a sheet metal housing with a removable cover. A visual indication of alarm and power shall be provided on detector front. Manual test and reset switch on front of detector. Power supervisory relay. Minimum of two sets of alarm contacts. UL listed. California State Fire Marshal listed. Air Products and Controls, SM - 501 Series.

2.2 SYSTEM COMPONENTS

A. Web Based Front End Controller with Graphical Interface: Provide color graphics accessible through the Owner's system (with security protocol) which will allow the user to override on/off and temperature set points directly. Real time data shall be continuously updated. The minimum graphic screens shall include the following:

1. Building locations of all equipment being controlled, control component locations and spaces served. By selecting the desired equipment item, a flow diagram shall be displayed for the related equipment (as described below). By selecting a conditioned space, a graphic display of the zone conditions shall be displayed (as described below).

2. Flow diagrams shall be provided for each HVAC system, with all inputs and outputs dynamically displayed.

3. Each temperature control zone shall have a screen providing set points, temperatures, and related HVAC system status data.

B. Enclosures: Hinged, lockable front panel. The panel shall be identified with a label as specified. No conduit or other penetration of any kind shall be made on top of the enclosure. If any such entry is made, a plug is not acceptable; replace the enclosure. Hoffman with metal back panel. For field control devices, NEMA 1 for indoor; NEMA 3R for outdoor. For supervisory panel, NEMA 12.

C. Wiring: Sensor and communication cable shall be shielded cable, wire gage and number of wires as recommended by the system manufacturer. Install per manufacturer's recommendations. No splices will be allowed. Identify both ends at terminal blocks. All wiring that is routed below grade shall have a PVC jacket. All other wiring shall be plenum-rated.

D. Conduit: Size conduit per the California Electrical Code and then increase by one size, except that the minimum conduit size for low voltage shall be 1" and the minimum conduit size for 120 volt power shall be ¾". For underground conduit, provide 100% spare capacity by installing a second conduit (empty) along all conduit routes.

E. Labels: All labels, signs, etc. shall be engraved, laminated plastic, white on black background, 1/8" high lettering, minimum.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: All electrical work shall be in accordance with the California Electrical Code and the Electrical Specification Sections. Wiring shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed wiring shall run in conduit parallel to room surfaces. Wiring in walls or in mechanical rooms, janitor rooms, or storage rooms shall be in conduit. No structural member shall be weakened by cutting, notching, boring or otherwise. Provide power wiring for each device requiring external power. Dedicated circuits shall be provided for devices as required by the manufacturer. Devices or wiring exposed to the weather shall be protected in NEMA 3R enclosures and weatherproof conduit. All conduit shall include a pull wire. Set, test, and adjust the system for proper operation. Provide connection to the Owner's network for web-based access to stand-alone controllers.

B. Programming: The Contractor shall be responsible for programming the system and shall coordinate the scheduling (on/off times) with the Owner. All point lists and programming blocks shall be provided by the Contractor. The project will not be considered complete until all programming and graphics have been completed and all systems are operational from the location of the web based front end controller.

C. Control Panels/Enclosures:

1. ASC's, transformers, relays, etc. shall be housed in enclosures. Wherever practical, do not locate enclosures above ceilings. Maintain access to enclosures that are located above ceilings.

2. For all enclosures, provide a disconnect switch and an in-line fuse. All wiring shall be terminated at terminal strips – no wire nuts. Provide a plastic covered wiring diagram in each enclosure. All wiring (field and inside enclosures) shall be labeled at both ends with machine printed markers – black on white tape. At packaged equipment, locate the enclosure on the side of the unit without obstructing access or service clearance.

3. Separate 120 volt circuits from low voltage circuits horizontally. A physical barrier is not required. Enclose wiring within the enclosure in 2"x2" Panduit.

3.2 TRAINING

A. Prior to final acceptance, the Contractor shall provide operational training to the Owner's personnel. The training sessions shall include a complete demonstration of the system. Dates and times of the training sessions shall be coordinated through the Owner not less than one week prior to session. A total of 8 hours of instruction shall be provided - 4 hours initially, and 4 hours to be spread throughout the first year of operation. The Contractor shall maintain a log of training sessions including dates, times and names/titles of those attending. The Contractor shall submit a copy of this log on request.

3.3 TESTING AND ACCEPTANCE

A. The Contractor shall verify, in the presence of the Owner, the system accuracy and proper function of each controlled device and sensor. The following items shall be successfully demonstrated prior to acceptance by the Owner:

1. All system outputs including controllers, relays, and other control devices shall be addressed and start/stop functions demonstrated.

2. All inputs shall be displayed and all event-initiated functions shall be demonstrated.

3. Demonstrate program integrity and power restore sequence during and after a power failure and restoration.

4. Deliver all record drawings, wiring diagrams, equipment specifications, operation and maintenance manuals and other documentation as required to describe the system.

5. Complete operator training in the use, programming, and operation of the system.

3.4 SERVICE WORK

A. Service work shall be performed by service personnel in the direct employ of the controls contractor. The service technicians shall be factory trained and certified by the manufacturer to be competent in all aspects of the installed system. The technician shall have a working knowledge of calibration techniques, preventive maintenance, troubleshooting, software diagnostics and microprocessor repair. Precaution shall be taken to minimize disruption of facility operations by service work.

3.5 SEQUENCE OF OPERATION

A. Exhaust Fans: See Exhaust Fan Schedule for control.

B. Packaged AC Units:

1. Each unit shall be directly controlled by a dedicated EMS controller mounted in a UL listed NEMA 508A enclosure and mounted on or around the unit exterior. The BAS System shall interface with the unit to provide control.

2. Each unit shall be controlled via a wall mounted electronic temperature sensor. This sensor shall include Heat-Off-Cool and On-Auto fan control accessible by the occupant.

3. Cooling Operation: If cooling is required, the first stage shall enable the economizer to modulate return and outdoor air dampers to maintain proper temperature. The second stage shall enable mechanical cooling.

4. Heating Operation: During the morning warm-up cycle the dampers shall remain closed. The controller shall compare the heating set point with the space temperature and determine a heating control signal to operate the gas valve.

5. Refer to the CO2 requirements on the drawings.

C. All Variable Refrigerant Flow (VRF) Equipment: For control of all VRF equipment refer to Specification Section 23 08 50. The EMS shall monitor the following points for each VRF air moving device: Device on/off status, room temperature, and device system faults.

D. Split-System Air Conditioner located in the Electrical Room: This unit operates continuously. Unit shall be controlled by integral factory controls with hard wired controller. Provide room sensor to monitor space temperature. Provide a status sensor for both the indoor unit fan and outdoor unit.

E. All Fire/Smoke Dampers and all Air Moving Equipment: All fire/smoke dampers shall be closed on fire or smoke alarm from the total coverage fire alarm system. This same signal shall also shut down all air moving equipment in the building.

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

All work under Divisions 26, 27, and 28 is subject to the General, Supplementary, Special Conditions and other Division 1 Specification Sections preceding this section. The Contractor will be responsible for and governed by all requirements. Drawings indicate the general arrangement of the electrical layout and work included. The Contractor will follow these drawings to lay out and check the drawings of other trades to verify locations and spaces in which work will be installed.

1.02 SUMMARY OF WORK

A. This portion of the work includes furnishing of all labor and materials necessary for a complete wiring system to outlets and all equipment shown on the Drawings or covered by this section of the Specifications. In general, the work includes the following:

1. Utility services and facilities as detailed on the Plans, including the defrayal of the utility installation charges.

2. Power service and distribution system as shown, complete with switchboards, panelboards, feeders and motor control centers.

3. Complete system of branch circuit wiring and equipment including all wiring devices and plates on all outlets.

4. A new lighting fixture system complete with lighting controls, as shown on Plans, including factory commissioning and acceptance testing.

5. Telephone, public address, security, data and fire alarm systems, including conductors, cable, and equipment, for complete working systems. Each system shall be terminated, tested, calibrated, and programmed by a factory authorized installer. The same installer shall terminate and test any peripheral equipment required for the operation of the system.

6. Raceways, wiring, fused disconnect switches, etc., for equipment covered by other sections of these Specifications.

7. All hangers, anchors, sleeves, chases and supports for fixtures, electrical equipment and materials including earthquake bracing.

8. All excavating, backfill, concrete pads and bases as required for electrical work.

9. All disconnection and removal of existing electrical facilities not to be reused or noted to be demolished.

10. Include payment of all required insurances, electrical permits, fees and taxes unless specifically shown "BY OTHERS".

B. The electrical drawings are diagrammatic and do not necessarily show all raceway, wiring, number or types of fittings, offsets, bends or exact locations of items required by the electrical systems. Items not shown or indicated which are clearly necessary for proper operation, payment or installation of systems shown shall be provided at no-increase in contract price.

C. The exact routing of systems and location of devices and equipment shall be governed by coordination with other trades, structural and architectural conditions. The Architect or Electrical Engineer reserves the right, at no increase in contract price, to make reasonable changes in location of electrical equipment or wiring systems; so as to coordinate with other systems, group them into orderly relationships, or to increase their utility. Contractor shall verify requirements in this regard prior to roughing in.

D. Install electrical work in cooperation with other trades and make proper provisions to avoid interferences and coordinate with structural and architectural features, in a manner approved by the Architect or Electrical Engineer. All changes caused by neglect to make such provisions shall be at Contractor's expense. Provide offsets and special fittings, as required to facilitate installation of the work.

E. When a particular product or type of product is specified with a manufacturer's designation, the latest published specifications, installation, and construction information of the manufacturer shall constitute the minimum acceptable standard. Any substitutions shall be made in accordance with the SUBSTITUTIONS sections of the Specifications.

1.04 RULES AND REGULATIONS

A. All work and materials shall be in full accordance with the latest rules and regulations of the following:

1. California Electrical Code (CEC), 2013 Edition

2. California Energy Commission, Title 24, 2013 Standards

3. California Fire Code, 2013 Editions

4. National Fire Alarm and Signaling Code NFPA 72, 2013 Edition

5. California Building, Mechanical and Plumbing Codes, 2013 Editions

6. California Code of Regulations

a. Title 8, Safety Orders

b. Title 19, Fire and Panic Safety Standard

c. Title 24, Part 1, Administrative Regulations

7. Occupational Health and Safety Act (OSHA)

8. California State Fire Marshal Rules

B. Where two or more codes conflict, the most restrictive shall apply.

C. Nothing in these Plans and Specifications is to be construed to permit work not conforming to these codes.

D. Before the Final Certificate of Payment will be issued, the Contractor shall deliver to the Owner all Certificates, Permits, Record Drawings and Instructions/Parts Manuals.

1.05 TESTS AND STANDARDS

A. The tests, standards, or recommended procedures of the following agencies shall relate to all parts of these Specifications and shall be considered a minimum:

1. American National Standards Institute (ANSI).

2. Underwriters Laboratories, Inc. (UL).

3. National Electric Manufacturers Association (NEMA).

4. Electrical Testing Laboratories (ETL).

5. National Fire Protection Association (NFPA).

6. Insulated Power Cable Engineers Association (IPCEA).

7. Institute of Electrical and Electronic Engineers (IEEE).

8. Illumination Engineering Society (IES).

1.06 EXAMINATION OF DOCUMENTS AND SITE

A. Before submitting a proposal, each bidder shall carefully examine the electrical, mechanical, architectural, and structural drawings and specifications. He shall also visit the site and fully inform himself as to all existing conditions and limitations applying to the work. If, after such examination and study, it appears that any change from the drawings and specifications should be allowed, the bidder shall so state in writing together with any change in cost involved.

B. By the act of submitting a proposal, each bidder shall be deemed to have made such examinations of the drawings and specifications and premises, and it will be assumed that he is therefore familiar with the entire scope of the project and has based his proposal upon the work described in the Drawings and Specifications and upon all existing conditions and limitations applying to his work.

1.07 IMPLEMENTATION

A. Workmanship: The work shall be performed by competent workmen, skilled in the particular phase of the work entailed. The work shall be first class throughout, neat, accurate and in full accordance with the intent of these Specifications and the satisfaction of the Architect or Electrical Engineer.

B. Safety: All standard safety procedures as set forth by OSHA, CCR, and California Division of Industrial Safety shall be strictly adhered to.

C. Coordination: The Contractor shall familiarize himself with the work of other crafts so as to be able to provide electrical service of correct size and voltage and other requirements to any equipment to be installed.

D. Scheduling: The installations shall be coordinated as to location and time, and interference causing delays and non-acceptable construction shall be avoided. Order equipment in a timely manner to prevent any delays in

the construction schedule and he shall bear any penalty by vendors to meet schedules.

E. Collaboration: Prior to commencing construction the Electrical Contractor shall arrange a conference with the general and sub-contractors as well as equipment suppliers and shall verify types, sizes, locations, requirements, controls, and diagrams of all equipment furnished by them.

F. Materials: All equipment and materials shall be new, UL (Underwriters Laboratories) approved, and of the best quality. When specific trade names are used in connection with materials they are mentioned as standards but, this implies no right upon the part of the Contractor to substitute other materials or methods without prior approval.

G. Excavation: The Contractor shall provide all excavating and backfill required for the proper installation of electrical work, whether or not shown on the Drawings or as specified. This shall be done per the EXCAVATION portion of the Specifications.

H. Cutting and Repairing: The Electrical Contractor shall do all cutting necessary for the proper installation of his work, repair any damage done by himself or his workmen, and coordinate his work with that of others. Do no cutting or patching without approval of the Architect or Electrical Engineer. Round holes through concrete slabs or walls shall be core drilled with a diamond drill, rectangular openings shall be cut with a diamond saw. In no case shall any concrete beam or column be cut.

I. Sleeves and Openings: Electrical Contractor shall be responsible for all sleeves and openings through walls and floors required by electrical work. All openings around conduits in sleeves shall be sealed with a material of equal fire rating as the surface penetrated. Openings not utilized shall be temporarily sealed in a similar manner. All required sleeves shall be furnished to and coordinated with the General Contractor.

J. Cleaning and Painting: All exposed work shall be thoroughly cleaned upon completion of work. All panelboards and equipment not located in electrical or mechanical rooms or closets shall be field painted per painting specifications, color as selected by Architect. Panelboard enclosures, fixtures, and equipment, where finish has been marred in shipment or installation, shall be completely refinished. Minor finish damage shall be rectified as indicated by the Architect or Electrical Engineer. Contractor shall remove all waste and rubbish resulting from his work from the site.

K. Earthquake Restraint: All electrical equipment shall have a means to prohibit excessive motion during an earthquake. Equipment that vibrates during normal operation shall have isolators with mechanical stops. All transformers are considered to vibrate during operation. All electrical equipment and connections shall be designed to resist lateral seismic forces equal to value shown on Drawings of equipment weight with allowable working code capacity increased by 1/3 or 1.5 times the same value for the weight yield capacity. Connections shall be the same except the 1/3 increase will not be allowed.

L. Mechanical Equipment and Other Special Equipment:

1. Prior to commencing construction, the Contractor shall arrange a conference with the Mechanical and Plumbing Contractors, and the Equipment Suppliers, to verify type, sizes, locations, requirements, controls and diagrams of all equipment furnished by them. In writing, he shall inform the Electrical Engineer that all phases of coordination of this equipment have been covered. If any unusual conditions or problems arise, they are to be enumerated them at this time.

2. The Contractor shall furnish all electrical line voltage wiring, fused disconnects and conduits, unless otherwise shown.

3. The Contractor shall be responsible for electrical hook-up and connection to all electrical equipment furnished by all Contractors of this Project. This includes all mechanical equipment, plumbing equipment, and special equipment furnished by other contractors.

M. Portable and Detachable Parts: The Contractor shall retain in his possession and shall be responsible for all portable and detachable parts or portions of the installation such as fuses, keys, locks, adapters, locking clips, and inserts until final completion of his work. These parts shall be itemized and delivered to the Owner at Project Closeout.

1.08 QUALITY CONTROL

A. Supervision: The Contractor shall personally, or through a competent representative, constantly supervise the work from beginning to completion and final acceptance. He shall cooperate fully with the inspection authorities in the provision of information and access to the work. He shall, to the best of his ability, maintain the same job foreman throughout the life of the project unless a replacement is requested or authorized by the Architect or Electrical Engineer.

B. Inspection and Tests: The Contractor shall furnish all labor and test equipment required to fully test and adjust the equipment installed under this specification and demonstrate its proper operation.

1. Arrange for all tests and inspections and provide minimum 48 hours' notice to the Architect or Electrical Engineer.

2. A test must demonstrate that each piece of equipment, outlet, fixture, device, and appurtenance is in sound operating condition and in proper cooperative relation to associated equipment.

3. All tests shall be conducted under supervision of the Architect or Electrical Engineer, and any defects of any nature which are apparent as a result of such test shall be made correct to the satisfaction of the Architect or Electrical Engineer before final acceptance is made.

4. No equipment shall be tested, or operated for any other purpose, such as checking motor rotation, until it has been fully checked in accordance with the manufacturer's instructions.

C. Warranty: The Contractor agrees to replace or repair, to the satisfaction of the Owner, any part of the installation which may fail due to defective material and/or workmanship or failure to follow Drawings and Specifications, for a period of one year after final acceptance. Any damage to other work resulting from such failure or the correction thereof shall be remedied at the Contractor's expense. The Contractor shall, further, secure from the manufacturers of special equipment, such as signal systems, their respective guarantees and deliver same to Owner. Guarantees between Contractor and his suppliers shall not affect warranties between Contractor and Owner.

1.09 SUBMITTAL

A. Make submittal for all material to be used on the project, whether as specified or substitutions, within thirty five (35) days after award of Contract by the Owner, in accordance with Section 01-300, SUBMITTAL, and the following:

1. All submittal shall be neat and bound in a suitable folder or binder.

2. Identify each item by manufacturer, brand, trade, name, number, size, rating, and whatever other data is necessary to properly identify and check materials and equipment. Words "as specified" are not sufficient identification.

3. Identify each submittal item by reference to specifications section paragraph in which item is specified, or Drawings and Detail Number.

4. All submittal shall be submitted in coherent groups, e.g. all light fixtures at one time. No partial, or incomplete submittal will be accepted.

5. Organize submittal in same sequence as they appear in specification sections, articles or paragraphs.

B. Product Data: Submit eight copies, in groups, as follows:

1. Boxes, pullboxes, conduits, and raceway types required, including fittings

2. Electric Wire, cable and connectors

3. Circuit breakers, Panelboards, Transformers, and disconnects.

4. Lighting fixtures

5. Wiring Devices

6. Special System Equipment

C. Shop Drawings: Shop drawings shall show physical arrangement, wiring diagram, construction details, finishes, materials used in fabrication, provisions for conduit entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, weight, power sources, circuit numbers, and shall be compatible with the Contract Drawings and Specifications.

D. Show wiring as actually installed, connected, and identified for this specific project. Include identification of cables and cable conductors.

E. Shop and instruction drawings shall cover the equipment or device to be installed and not merely the general class of such equipment or device.

1.10 SUBSTITUTIONS

A. The Specifications or Drawings are in no way to be construed as being proprietary toward one product. Those products, or types of products, listed are intended to set the standard for quality, design, and installation procedure. However, no right is implied upon the part of the Contractor

to substitute other materials, products or systems without the written approval of the Architect or Engineer.

B. All requests for substitution shall be made in accordance with the SUBSTITUTIONS section of the Specifications.

C. All requests for substitutions shall be in writing, received at least 14 days prior to bid date, and shall indicate all information required thereon including differences from the specified item. The request for substitution shall be accompanied by cuts, product literature, performance data, specifications, drawings, samples or other means as may be required for proper evaluation by the Architect or Electrical Engineer.

D. All proposed substitutions shall be standard product of the firm under current manufacture and be a catalog item at time of bid.

E. Acceptance of substitution shall not relieve the Contractor from responsibility for complying with requirements of the Contract Documents. The Contractor shall be responsible for changes in other parts of the work occasioned by his substitutions and shall bear their expense.

F. Representative samples may be required for determination of equality. It is understood that the samples may be subjected to destructive testing and will not be returned.

1.12 GUARANTEE

This Contractor agrees to replace or repair to the satisfaction of the Owner, any part of the installation that may fail due to defective material and/or workmanship, or failure to follow Plans and Specifications for one year after final acceptance. He shall further obtain from the manufacturers of special equipment (i.e., control systems) their respective guarantees and service manuals and deliver to Owner.

1.13 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

The Engineer's decision will be final on interpretation of the Drawings and Specifications. Whenever "AS MAY BE DIRECTED", "SUITABLE", "APPROVED EQUAL", "AS REQUIRED", or other words of similar intent and meaning are used which infer that judgment is to be exercised, it is understood that it is the judgment of the Engineer being referred to.

PART 2 – PRODUCTS

2.01 RACEWAYS:

A. Except where specifically shown otherwise in this section, the Contractor shall furnish and install a complete steel, rigid thread galvanized rigid steel conduit system for all wiring, including control and signal wiring.

B. Galvanized Rigid Steel (GRS)

1. All conduits shall be rigid threaded hot dipped galvanized type.

2. Joints are to be sealed with conductive pipe compound T&B "Kopr-Shield" before making up.

3. Conduits installed below grade shall be wrapped with 3M "Scotchrap #51" corrosion protection tape using half-laps for double thickness. Conduit surfaces are to be clean and dry before wrapping.

C. Steel Electrical Metal Tubing (EMT)

1. EMT may be used within the hollow dry spaces of buildings, minimum 96" above the finished floor. Trade sizes 4" and smaller may be used within hollow dry spaces of the building.

2. EMT conduit shall be Allied True Color E-Z Pull, or equal, with a colored finish specific to the following systems:

a. Natural: 0-150V-to-Ground Power & Lighting

b. Yellow: > 150V-to-Ground Power and Lighting

c. Blue: Copper Data & Communications

d. Orange: Fiber Optic Cable

e. Red: Fire Alarm

3. All raceway fittings, locknuts, couplings, elbows, etc., shall be hot dipped galvanized steel finish with plastic throats or bushings. Cast-type fittings shall not be used.

D. Non-Metallic Polyvinylchloride Conduit (PVC):

1. Rigid nonmetallic PVC, UL labeled and fittings approved for the purpose may be used for electrical systems 0-600V-to-ground under the following conditions:

a. All conduits in earth under buildings or protected by permanent paving may be Schedule 40 PVC. Any conduits running through planters or unprotected are to be encased in 3" of concrete. All raceways above grade are to be steel.

b. Risers shal be blue color, factory PVC coated T&B "Ocal" steel ells. Bends less than 45 degrees and offsets may be field bent.

2. All nonmetallic runs shall have a bond wire for the interconnecting of all conducting portions per Article 250 of the California Electric Code.

3. PVC shall never be used above grade.

E. Liquid-Tight Flexible Metal Conduit (LFMC):

LMFC may be used in lengths not greater than 36" at motors and other machinery to prevent the transmission of vibration. LFMC shall be supported at both ends.

F. Surface raceways and fastenings are to be two-piece steel type, complete with all fittings of the same manufacturer and factory finished in gray. Surface plug-in strips shall be two circuit type with NEMA grounded receptacles every 12" with wiring space provided.

G. The minimum size conduit for lighting, power, and signal wiring shall be 3/4" trade size.

H. Conduits installed underground shall have a minimum coverage of 24" below a finished grade. Provide a magnetically traceable warning tape at 12" below grade. Electrical systems rated greater than 150V to Ground shall have a 3" concrete envelope.

2.02 CONDUCTORS:

A. All conductors shall arrive to the project in their original, unbroken packages plainly marked as follows:

1. Packaging shall indicated underwriter's labels, size, conductor material, insulation of wire, names of the manufacturer and the trade name of the wire.

2. Wire or cable shall have factory markings every 24". Markings shall show its maximum allowable voltage, wire size and insulation.

B. All conductors shall be a minimum of 98% conductivity, soft drawn copper, minimum #12 AWG unless shown otherwise. Conductors sized #8 and larger shall be stranded. Conductors sized #10 and smaller shall be solid type, except wiring within fixtures. Insulation shall be 600 Volt, type "THWN."

C. Control circuits for mechanical equipment in locations subject to abnormal temperatures on or under furnaces and heaters shall be Type "RHH" 600 Volt insulation conductors.

D. All branch circuits, fixture wiring joints, splices and taps for conductors #10 and smaller to be made with "Scotchlok" connectors.

E. Two-bolt type solderless connectors or T&B "ColorKeyed" compression lugs shall be used on #8 and larger conductors.

2.03 WIRING DEVICES:

A. Furnish and install wiring devices and plates as shown on the Drawings and described in these Specifications. Where more than one wiring device is mounted in the same location, such devices shall be mounted in a multi-gang plate. Wiring devices shall be specification grade or better.

B. Wiring devices shall be of the color selected by the Architect.

C. Convenience outlets to consist of a specification grade duplex receptacle mounted in an outlet box in the wall, flush with the finished plaster or surface. Outlet rating to be 20 AMPS, 125 Volts, 3-wire, back and side wired.

D. All outlets shown outdoors or in damp locations shall be GFI type, installed in a weatherproof box and cover equipped with rubber gaskets. Surface outlets shall be weatherproof type FS boxes with hubs as required and equipped with rubber gaskets and weatherproof covers.

E. Local switches shall be quiet toggle type, totally enclosed, 20 AMPS, 277 Volts AC rated.

F. Device plates shall be provided for all devices with the number of gangs and openings necessary. They shall be satin brushed 302 stainless steel, unless specified otherwise.

G. Switch plates for all outlets not in sight of a switch shall be labeled with filled etched letters showing locations of the outlet controlled.

H. Pilot lights shall be the type with an indicating neon lamp in a handle.

2.04 OUTLET BOXES:

A. Outlet boxes for concealed work shall be one piece pressed steel knock-out type with zinc or cadmium coating. Boxes shall not be smaller than 4" square nominal size unless otherwise indicated. Provide extension rings, extenders, plaster rings and covers necessary for flush finish. No back-to-back or through-boxes shall be used.

B. Bar hangers shall be used to support outlet boxes in stud or furred partitions and ceilings. Attachment screws, devices, etc., shall be of the proper type to secure boxes to metal studs. Use expansion shields in concrete and masonry. Where used for lighting fixtures, outlet boxes shall be equipped with fixture studs.

C. Provide approved knock-out seals on all unused open knock-out holes.

D. Outlet boxes installed in concrete slabs shall be two-piece concrete boxes, not less than 4" nominal size with a minimum depth of 2 ½".

E. Surface boxes of cast metal threaded hub-type with suitable gasketed covers shall be used for exposed conduit runs less than 5' above finished floor, or where waterproof boxes are required.

2.05 PULL BOXES AND WIREWAYS:

A. Pull and junction boxes shall be installed as shown to ease the pulling of wire and to comply with CEC requirements.

B. Wireways shall be constructed in accordance with UL 870 for wireways, auxiliary gutters and associated fittings. Every component, including lengths, connectors, and fittings, shall be UL listed.

2.06 TERMINAL CABINETS AND CLOSETS:

A. Cabinets and fronts shall be in accordance with NEMA Standard Publication No. PB 1-1971 and UL Standard No. 67. Fronts shall include doors and have flush brushed stainless steel, cylinder tumbler-type locks with catches and spring loaded door pulls. The flush lock shall not protrude beyond the front of the door. All locks shall be keyed like the panelboard locks. Fronts are to be adjustable indicating trim clamps that shall be completely concealed when the doors are closed.

B. Doors shall be mounted by completely concealed steel hinges. Fronts shall not be removable with the door in the locked position. A frame and

card with a clear plastic covering shall be provided on the inside of the door. Fronts shall be of code gauge full finish steel with rust inhibiting primer and baked enamel finish.

C. Install finish grade 3/4" plywood board, primed and painted light gray on both sides and the edges, at the interior rear surface of telephone and signal cabinets.

D. Provide solderless box lugs, terminal blocks with a white marking strip for conductors sized #16 and larger. Punch-down terminals shall be used for No. 18 and smaller and shall be used for all public address, intercom and other electrical terminations.

2.07 FLOOR BOXES AND UNDERFLOOR DUCTS:

A. Provide fully adjustable Type 1, Class 1 watertight floor boxes complete with pedestal and wiring device where shown on Plans.

B. Furnish and install a complete duct system as shown on Plans. The system shall consist of separate ducts: No. 2 duct for electrical power service; No. 4 duct for telephone; No. 4 duct for data. Ducts shall have 2" inserts on 24" centers. Furnish and install the necessary junction boxes, couplings, supports, adapters, etc., to form a complete assembly made watertight with sealing compound.

C. Ducts and junction boxes shall be manufactured from 14 gauge steel. They shall be UL listed and finished with a corrosion resistant coating. The junction boxes must be furnished with the proper depth to accommodate floor finish. Junction box cover plates to have an upward adjustment of 3/8". Cover plates must be leveled flush with the finished cement floor before and after the concrete has hardened.

D. Furnish and install, where shown, telephone, data and power service fittings. All service fittings shall be furnished with receptacles, adapters and no spin locking nipples or supports.

E. Fittings for floor boxes or ducts shall be brushed aluminum finish.

F. Provide carpet flanges of proper size in carpeted or tiled areas.

2.08 CONCRETE PADS, PULL HOLES AND MANHOLES:

A. At the Contractor's option, he shall provide cast-in-place or precast structures.

B. Where applicable, concrete structures shall be submitted to the serving

utility for their approval before installation.

C. Cast-in-place concrete shall be per the concrete section of the Specifications.

D. Provide 8" concrete pads under all exterior switchboards, transformers, etc.

2.13 NOISE CONTROL:

A. Outlet boxes at opposite sides of partitions shall not be placed back-to-back or through-boxes employed except where specifically permitted on the Drawings by note to reduce transmission of noise between occupied spaces.

B. Contactors, starters, and similar noise-producing devices shall not be placed on walls that are common to occupied spaces unless specifically called for on the Drawings. Where such devices must be mounted on walls common to occupied spaces, they shall be shock mounted or isolated in such a manner to effectively prevent the transmission of their inherent noise to the occupied space.

C. Contactors, starters, drivers, and like equipment found noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced at Engineer's request.

PART 3 – EXECUTION

3.01 INSTALLATION - GENERAL:

A. The layout and installation of electrical work shall be coordinated with the overall construction schedule to prevent delay in completion of the project. Checking these Drawings before organizing the electrical work schedule or installing material and equipment shall be obligatory.

B. Dimensions and information regarding accurate locations of equipment and structural limitations and finish shall be verified with other sections.

C. The Drawings do not show all the offsets, bends, special fittings, junction boxes, or pull boxes necessary to meet job conditions and the CEC. They shall be provided as required.

D. Electrical equipment, outlets, junction and pull boxes shall be installed in accessible locations avoiding obstructions, preserving headroom and keeping openings and passageways clear.

E. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect function of the equipment. Major adjustments for the location of equipment shall be approved by the Architect and detailed on the Record Drawings.

F. Structural Fittings: Furnish and install the necessary sleeved, inserts, hangers, anchor bolts and related structural items. Install at the proper time.

G. Openings have been shown on the Architectural and Structural Drawings. Should any additional openings or holes be required for the work of this section, the cost shall be the obligation of this section.

H. Contractors shall inspect and account for existing conditions affecting his work.

I. Sleeves for electrical conduits passing through walls or slabs shall be placed under the work of this section before concrete is poured. Where conduits pass through suspended floor slabs, sleeves shall be standard weight galvanized steel pipe extending 2" above the finished floor level.

J. Sleeves at other locations shall be either light weight galvanized steel pipe or galvanized sheet steel. Clearance between conduits and sleeves shall not be less than ½".

K. Sleeves through outside walls and below grade shall be caulked tight with oakum and the ends sealed with an approved semi-plastic coal tar base compound or shall be of the stuffing box type. Other sleeves shall be packed with glass wood ends sealed with Duxseal and covered with chrome plated escutcheon plates.

L. Conduits entering through floor slabs at grade level will not require sleeves and shall be placed with tops of couplings flush at floor level.

M. Sleeves for electrical conduit passing outside walls below grade shall be the through-wall and floor seal type.

3.02 INSTALLATION OF CONDUITS AND RACEWAYS:

A. Raceways for electrical or signal systems run in earth that are not protected by permanent paving shall be encased in concrete with the encasement extending under the building. Branch circuit and signal system conduits installed underground between outlets, terminals, and panels within the building shall be liquid and gas tight.

B. Conduits shall be concealed unless otherwise shown. All conduit runs exposed to view, except those in attic spaces, shall be installed parallel or at right angles to structural members, walls, or lines of the building.

C. All conduit runs shall be mechanically and electrically continuous from outlet to outlet. Conduit size or type shall not be changed between outlets.

D. No conduits shall be run on the roof unless specifically shown on the roof. They shall be full weight rigid steel on PVC sleepers. Install roof jacks at penetrations.

E. Conduit stubs installed for future extensions shall be rigid steel for at least 5' of a conduit run. The conduit ends shall be terminated with couplings and pipe plugs. The closed end shall be double wrapped with Scotchrap #50 for the last 12". The concrete envelope shall leave 3" of the wrapped conduit exposed for future connection.

F. Conduit for equipment connected permanently to the floor shall be installed with a 6" rigid conduit nipple to a flush coupling to ensure a watertight connection at the floor.

G. All conduits shall be sloping to drain and shall be sealed with JM Clipper "Duxseal" on the high end.

H. All conduit bends shall be carefully made so that the conduit is not flattened, kinked or otherwise compromised. The inner radius of any conduit bend shall be not less than eight times the inside diameter. Where conduits are run exposed in groups, bends of all conduits shall have a common center. Use of standard elbows will not be allowed at these locations.

I. Each run of a conduit shall be finished before concrete, plaster, etc., is installed to ensure against obstruction or omissions. After installation, the ends of all conduits shall be plugged with metal pennies. All conduit systems shall be completed and thoroughly cleaned and dried inside before installation of any conductors.

J. Conduits shall enter at right angles and be connected to all outlet boxes, pull boxes, and cabinets with locknuts and plastic throated grounding bushings, providing a continuous grounding system in accordance with CEC Article 250.

K. Use Erikson couplings where a union is necessary. Running threads will not be permitted.

L. Pull 1/8" stranded nylon pull ropes with 18" coiled at each end in all empty conduits with identification tags indicating source and destination.

M. Furnish and install seal-offs in all conduit runs through areas of different temperature.

N. All concealed conduits shall be installed in as direct a line as possible between outlets. No more than four (4) quarter bends or their equivalent will be allowed between outlets. Feeder conduits shall follow arrangement shown on Plans unless a change is authorized. In general, branch circuit conduits shall follow the arrangement as shown insofar as structural conditions permit.

O. All exposed runs shall parallel buildings, walls, or partitions, and shall be supported on Kindorf Hangers to meet Title 24 Part 6, California Code of Regulations.

P. All telephone, data, and other signal conduits shall be installed with long radius sweeps. No factory ells will be permitted.

Q. Chrome escutcheon plates are to be used on all conduit penetrating walls, floors or ceilings.

R. Expansion joints shall be provided at building structural expansions or as required due to length of run or difference in temperatures.

S. All fittings exposed or in damp areas shall have sealing glands and proper gaskets. Fittings in hazardous areas shall be of the type approved for the particular hazard.

T. Provide two 1" conduit stubs out of all panels and terminal cabinets to above a hung ceiling or as otherwise shown.

U. Roof Penetrations:

1. Where raceways penetrate roofing or any similar structural area, provide iron roof jacks sized to fit tightly to a raceway for a weather-tight seal with the flange extending a minimum of 9" under roofing on all sides. Completely seal the opening between the inside diameters of the roof flashing and the outside diameters of the penetrating raceways. Coordinate all work with the roofing section of Specifications.

V. Fire Penetration Seals:

1. Seal all penetrations for work of this section through fire rated floors,

walls and ceilings to prevent the spread of smoke, fire, toxic gas or water through the penetration before, during or after a fire. The fire rating of the penetration seal shall be at least that of which it is installed so that the original fire rating is maintained as required by CEC Article 300.21.

2. Where applicable, provide OZ Type CFSF/1 and CAFSF/1 fire seal fittings for conduit and cable penetrations through concrete and masonry walls, floors, slabs and similar structures. Apply an approved firestopping system, including wall wrap, partitions, caps and other accessories as required. All manufacturers' instructions and recommendations for installation of sealing fittings and barrier sealing systems.

3.03 CONDUCTORS AND CONNECTIONS:

A. General Requirements:

1. All branch circuit and fixture wiring joints, splices and taps for conductors #10 and smaller shall be made with UL approved connectors listed for 600 Volts. Connector bodies shall consist of a cone shape rotating expandable coil spring inserts insulated with phenolic or plastic shell.

3. Do not install wire in conduits until all work of any nature that may cause injury (including pouring of concrete) is completed. Use care in pulling in wires to prevent damage to wire or insulation. Do not use blocks, tackle or other mechanical means to pull #8 AWG or smaller conductors.

4. Splices are not permitted except in outlet boxes, pull boxes, junction boxes, panelboard gutters and auxiliary gutters. No splices shall be made in underground boxes.

5. Use only wire pulling compounds listed by the UL as a lubricant for pulling conductors through raceways. The use of cleaning agents that have deleterious effect on conductor coverings are not permitted.

6. Unless otherwise shown on Plans or specified elsewhere, leave at least 12" of free conductors at each connected outlet (outlets connected to equipment or device) and 9" of free conductors and coil neatly in outlet box for future connection.

B. Terminations:

1. Circuit and signal terminations to single screw or push on terminals shall be done with insulated "Sta-Kons" or approved equal terminals.

2. Bolt type solderless connectors shall be torqued with a torque wrench according to the manufacturer's recommendations and then retightened after 24-48 hours before taping. Owners' inspector shall be informed of this procedure during the waiting period and shall witness the act of retightening.

C. Feeders and Branch Circuits:

1. Connectors and lugs for terminating stranded conductors sized #8 and larger shall be machine crimp compression type.

2. All splices shall be taped with Scotch "Super 88" vinyl electrical tape, and "Scotch Fill" tape putty where necessary for a smooth joint. For other than normal temperatures or conditions, Scotch #27 or #2520 shall be used.

3. No splices shall be made below grade in a manhole or pull holes without the Engineer's written approval. When approved, these shall be encapsulated with 3M potting kits per 3M Specifications.

4. Wires in panels, cabinets, pullboxes and wiring gutters shall be squared, labeled, and neatly grouped with Ty-raps and fanned out to the terminals.

5. Support all conductors in hand holes/manholes and label with plastic rope. Tag all conductors with plastic waterproof tags.

3.04 WIRING DEVICES:

A. Wiring devices shall be securely fastened to the outlet box. Where the outlet box covers are back from the finished walls, the device shall be built-out with washers so that it is rigidly held in place to the box. Provide metal extenders in flammable construction per CEC.

B. All device screw slots shall be left in a vertical orientation.

3.05 OUTLET BOXES:

A. Boxes shall be securely fastened in position to the ceiling or walls with screws or bolts. Nails are not acceptable. The Contractor shall set and align all equipment, level, bolt down, or otherwise secure in place. No

back-to-back or through-boxes shall be used.

B. Boxes shall be accurately located and set square and true with exposed edges of a box or plaster ring flush with finished surface of walls or ceiling. All unused boxes shall be equipped with blank covers that shall match existing covers.

C. Boxes shall have no unused openings.

D. Boxes shall be cleaned of all direct plaster, etc., before conductors are installed. Rust spots shall be scraped to bare metal and painted with Rust-Oleum "Cold Galvanizing Compound".

E. Suspended fixture outlets shall be equipped with 3/8" fixture mounting stud bolted to wood backing or metal studs to safely support fixture weight.

F. Make any change in outlet location necessary to all job conditions and rearrange fixtures and equipment as directed.

G. Study all Plans as to relation of spaces surrounding outlets so that this work may be installed at the proper time with others. Fixtures and equipment shall be symmetrically located. Conflicts and discrepancies shall be referred to the Architect immediately and prior to box installation.

3.06 JUNCTION AND PULL BOXES AND WIREWAYS:

A. Boxes shall be installed square and plumb. An engraved nameplate shall be installed indicating the function of each box on the exterior in unfinished areas and on the interior in finished areas. Permanent markers are not acceptable.

B. Pullboxes and wireways shall be concealed or installed flush in finished areas. They shall be surface mounted in machine rooms or unfinished areas.

3.07 TERMINAL CABINETS AND CLOSETS:

A. Install, level and identify per schedule.

3.08 FLOOR BOXES AND PEDESTALS:

A. Floor boxes are to be installed level and plumb. Fill with paper prior to pouring concrete. Re-level after concrete has set, then raise to accommodate the floor finish.

B. The installation of pedestals shall be coordinated with cabinet work.

3.09 PANELBOARDS:

A. Location:

1. Unless otherwise indicated on the Drawings, install all panels with the top of the trip 6'- 0" above the finished floor.

2. Space permitting, surface mount the panels where they are not visible to the public.

3. Panels to have a protective cover over any electrical panel with overhead water piping. Cover to be 18" by width of a panel.

B. Directory:

1. Mount a typewritten directory behind glass or plastic in a metal holder welded to the inside of each panel door. Directory shall indicated circuit numbers and complete description of all loads on each circuit.

3.10 DISCONNECT DEVICES:

A. Disconnect devices shall be identify the location of the controlled device.

3.11 GROUNDING:

A. The conduit system supports, cabinets, switchboards, etc., and neutral conductors must be permanently and effectively grounded by means of approved ground clamp, in accordance with the electrical safety orders of the Department of Industrial Relations of the State of California.

B. This Contractor shall exercise every precaution to obtain good contacts at all panel boxes, pull boxes, etc. Where it is not possible to obtain good contacts, the conduit shall be bonded around the boxes with a #6B&S gauge, rubber covered, double braided wire with ground clamps.

C. Equipment and raceway bonding procedures shall be rigidly maintained and meet all jurisdictional requirements of codes and regulations.

D. A separate grounding conductor shall be run in all receptacle circuits.

3.12 IDENTIFICATION

A. Conductors:

1. All power and low voltage systems conductors and cabling shall be identified in accordance with the following schedule:

   a. 120/208 Volts, 3-phase, 4-wire Wye: Red-Black-Blue, Neutral White

   b. 120/240 Volts, 3-phase, 4-wire Delta: Black-Blue for single-phase, Orange for 3-phase stinger, Neutral White

   c. 480/277 Volts, 3-phase, 4-wire Wye: Yellow-Brown-Purple-, Neutral Grey

   d. Bond or grounding conductor (GWG): Green

   e. Special system conductors shall be color coded and labeled

2. Brady Labels shall be used to identify terminals and destination of feeders, branch circuits, signal and control circuits, etc., at all terminations and junction boxes and shall be coordinated with the nameplates in all boxes and equipment.

3. All terminals in the switchboards, panels, relays, switches, devices, starter terminals, etc., shall have Brady Labels for identification to identify both ends of all wiring. Wires #8 and smaller to be terminated on terminal strips squared-type 9080K with white marking strip and screw lugs for wire size.

B. Nameplates: The Contractor shall furnish and install 1" x 3" x 3/32" thick laminated black Nylon nameplates with a white core, unless specifically shown as red with a white core, engraved to produce white letters on black background for all items of electrical equipment including 2-pole and 3-pole circuit breakers, panelboards, starters, relays, time switches and disconnect switches. The plates shall screwed in place with stainless steel screws. Adhesive backed plates are not acceptable.

C. Panels: Panels having single-pole circuit breakers shall be provided with typed schedules mounted in welded metal holders behind plastic.

D. Devices: All devices shall have their branch circuit identified on the back side of device plate with a permanent type black marker, i.e., CKT A-21.

3.13 CONCRETE PADS, PULL HOLES AND MANHOLES:

A. Contractor shall provide a minimum of 3'-6" of sand or base material suitable to receive the manhole. The base material shall be compacted, graded level, and at proper elevation to receive the manhole in relation to the conduit grade or ground cover requirements as designated in the Plans.

3.14 SUPPORTS AND ANCHORS:

A. Provide inserts, anchors, supports, rods, brackets and miscellaneous items to adequately support and secure the electrical systems and equipment.

B. Secure hangers, brackets, conduit straps, supports and electrical equipment to surfaces by means of toggle bolts on hollow masonry. Utilize expansion shields and machine screws or standard preset inserts on concrete or solid masonry. Utilize machine screws or bolts on metal surfaces. Utilize wood screws on wood construction. Wood, fiber plugs, or concrete nails are not acceptable.

C. Power or velocity driven inserts may not be used for any anchorage unless specifically approved by the Engineer and where the use does not affect the finished appearance of work. Under no circumstance shall these be used in pre-stressed slabs, beams, purlins, or precast members in tension.

D. Seismic Requirements: Provide vertical and lateral supporting equipment to resist the application of seismic forces per California Code of Regulations, Title 24 Chapter 23.

END OF SECTION

SECTION 26 20 00

LOW VOLTAGE ELECTRICAL TRANSMISSION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 - Specification sections, apply to work of this section.

B. Section 26 05 00 - Basic Materials and Methods section and other Division 26 sections apply to work specified in this section.

1.02 SCOPE:

A. Work included: Furnishing and installation of a complete electrical service, distribution, and grounding system. Conditions of this section apply to all other 26 40 00 series sections included.

B. Related Work: Refer to other sections, particularly those listed below, so as to properly coordinate work specified herein with that specified elsewhere to produce a finished, workmanlike, fully functioning installation.

C. All other Electrical Sections: Division 26

1.03 QUALITY ASSURANCE:

See Section 26 05 00.

1.04 SUBMITTAL:

A. Product Data: Submit manufacturer's data on service entrance equipment, switchboards, motor control centers and/or individual starters, transformers, panelboards, disconnect switches and grounding components.

B. Trip Curves: When requested, submit trip timing curves for all circuit interrupting devices.

C. Nameplate Schedule: Submit nameplate schedule for approval.

1.05 COMPONENT COORDINATION:

In order to maintain close control and coordinate the various components of the distribution systems, the number of manufacturers shall be kept to a minimum. Equipment manufacturer shall be General Electric or Square D. It shall be the manufacturer's responsibility though the Electrical Contractor to coordinate all components of the system in order to ensure systems that will provide maximum protection of equipment and reliable safe operation.

1.06 NAMEPLATES:

Laminated phenolic plastic, color coded black for 120/208 volt equipment, with white letters. Provide for identification of each transformer, panelboard and motor control center, secure to face with two (2) chrome plated screws each. A schedule of nameplates shall be included with the shop drawings for approval.

1.07 FEEDER CONNECTIONS:

Provide cast, saddle type bolted lugs or hydraulically set compression lugs for all bus connections. Manufacturer shall be Thomas and Betts, Burndy, O.Z. or approved equal. Lugs in which the set of screw embeds directly into feeder conductor shall not be used.

1.08 MISCELLANEOUS:

A. Equipment Bases: Provide appropriately sized concrete housekeeping bases for all floor-mounted equipment.

B. Hoisting Lifting Lugs: Provide on all heavy equipment as required to ensure safe hoisting.

C. Space for Future Protective Device: Provide as indicated on drawings; shall be completely equipped for the future addition of a circuit breaker or fused switch, including all connections.

PART 2 – PRODUCTS

2.01 PANELBOARDS:

A. Panelboards shall be Bolt-down Circuit Breaker type, with voltage, phase, and breakers as specified in panelboard schedules. Panelboards shall be installed flush or surface or specified, at locations as indicated on plans. Panelboards shall be installed in code gauge rust proof steel cabinets with flush door having flush locks all keyed alike and with trim cut square and true.

1. Panelboards: Square D, type NQ, NQOB, and NF; General Electric A-Series and Spectra Series; or approved equal.

B. All panelboards and breakers shall meet the requirements of the indicated available symmetrical short circuit current or have a minimum bus bracing to meet figure shown.

C. All interiors shall be completely factory assembled. They shall be so designed that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors, so that circuits may be changed without machining, drilling or tapping.

D. Branch circuits shall be arranged using double row construction except when narrow column panels are indicated. A nameplate shall be provided listing panel type and ratings.

E. Unless otherwise noted, full size insulated neutral bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral bussing shall have a suitable lug or each outgoing feeder requiring a neutral connection. A ground bus will be included in all panels.

F. Boxes shall be at least 20 inches wide made from galvanized steel. Provided minimum gutter space in accordance with California Electric Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

G. Door hinges shall be concealed. All locks shall be flush, stainless steel, cylinder tumbler type locks with catches and spring loaded door pulls, keyed alike and directory frame and card having a transparent cover shall be furnished with each door.

H. All exterior and interior steel surfaces of the trim shall be properly cleaned, primed with a rust inhibiting phosphatized coating and finish with a gray ANSI 61 paint. Trims for flush panels shall overlap the box for at least 3/4 inch all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screwdriver without the need for special tools. After installation, trim clamps shall not be accessible when the panel door is closed and locked.

I. All main bus bars shall be cooper or tin plated aluminum sized in accordance with UL standards to limit the temperature rise on any current carrying part to a maximum of 50 degrees C above an ambient of 40 degrees C maximum.

J. Circuit breakers shall be quick-make, quick-break, thermal-magnetic, trip indicating, and have common trip on all multipole breakers. (Trip indication shall be clearly shown by the breaker handle taking position between ON and OFF when the breaker is tripped). Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker to prevent repeated arcing shorts resulting from frayed appliance cords. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" and carry the SWD marking. UL Class A (5 milliampere sensitivity) ground fault circuit protection shall be provided on 120V ac branch circuits as specified on the plans or panel board schedule. This protection shall be an integral part of the branch circuit breaker which also provided overload and short circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard branch circuit space than a conventional slide pole circuit breaker. Connections to the bus shall be bolt on.

2.04 DISCONNECTS:

A. Motor and circuit disconnects shall have an Underwriters' Laboratory label.

B. Disconnect switches shall be suitable for area where they are installed, i.e., weatherproof, and shall be rated heavy duty. Use only 600 volt class with proper number of poles. Switches shall be fused unless indicated on plans. Fuses shall be of type specified on equipment nameplate.

C. When a disconnect switch is not clearly visible from the control location, provide an operating handle which is lockable in the open position.

2.05 GROUNDING:

A. Clamps, bonds, etc. suitable and as necessary to provide continuous ground system.

B. Ground Rods: "Copperweld" 3/4" diameter 8' long.

C. All grounding conductors shall be copper, sizes not less than that required under CEC Table 250.122.

D. All grounding electrode conductors shall be copper, sizes not less than that required under CEC Table 260.66.

2.06 SWITCHBOARDS:

A. Manufacturer's: Subject to compliance with requirements, provide switchboards of one of the following:

General Electric Company
Square D Company

B. General: Except as otherwise indicated, provide switchboards of types, sizes, characteristics, and ratings indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, and as required for complete installation. Service entrance switchboards shall comply with serving utility requirements.

C. AC Dead-Front Distribution Switchboards: Provide factory assembled, dead-front, metal enclosed, self-supporting secondary power switchboards, of types, sizes and electrical ratings and characteristics indicated; consisting of panel (vertical) units, and containing circuit breakers of quantities, ratings and types indicated. Provide copper or tin plated aluminum main bus and connections to switching devices of sufficient capacity to limit rated continuous operating temperature rise to 54 degrees F, and 90 degrees F for circuit breaker branches; with main bus and tap connections silver-surfaced and tightly bolted for maximum conductivity. Brace bus for short circuit stresses up to maximum interrupting capacity. Prime and paint switchboard with manufacturer's finish and color. Construct units for outdoor, NEMA Type 3R.

D. Enclosures: Construct dead-front switchboards, suitable for floor mounting, with front cable/wire and conduit accessibility as indicated. Provide welded steel channel framework, hinge wireway front covers to permit ready access to branch circuit breaker load slide terminals. Coat enclosures with manufacturer's standard corrosive resistant finish.

E. Bussing: Provide switchboard with sufficient cross-sectional area to fulfill U.L. Standard 891 pertaining to temperature rise.

2.06 MOTOR STARTERS:

A. Manual motor starters to be quick-make, quick break, with overload protection. General Electric cr 101 for 120/240 volt 1 hp or less.

B. Magnetic motor starters shall be across the line unless indicated with control power transformer (120V coil) and overload relay protection.

Combination type shall have integral fused switch or circuit breaker as indicated.

PART 3 – EXECUTION

3.01 INSTALLATION OF SWITCHGEAR AND SWITCHBOARDS:

A. Install switchgear and switchboards as indicated, in accordance with manufacturer's written instruction, and with recognized industry practices to ensure that switchboards comply with requirements of NEMA and CEC standards, and applicable portions of NECA's "Standard of Installation".

B. Prior to energization of circuitry, check all accessible connections to manufacturer's torque specifications. Subsequent to wire and cable hook-ups, energize switchboards and demonstrate functioning in accordance with requirements.

3.02 INSTALLATION OF PANELBOARDS:

A. Provide mounting brackets, busbar drilling, and filler pieces for unused spaces.

B. Branch circuits shall be connected as shown in line diagrams and/or panelboard schedules, with wires neatly tie wrapped in panel.

C. All distribution panelboards shall have all sub feeders and main breakers marked with 1" x 3" plastic name tags secured with two self tapping screws.

D. All panelboards shall be provided with a 2" x 3-1/2" plastic name tag on the front of the panel door or on the trim, indicating panel designation and distribution panel and circuit feeding above panel, secured with two self tapping screws.

E. Branch circuit panelboards shall have a plastic covered circuit directory card on the inside of each door with all circuit destinations neatly typed.

F. Contractor shall check and tighten all factory made wire or lug connections. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standard 486A.

G. Install four (4) spare 3/4" conduits from all panelboards to accessible ceiling space.

3.03 INSTALLATION OF DISCONNECTS:

Install disconnects for all equipment and motors of the size required and as recommended by manufacturer.

3.04 INSTALLATION OF GROUNDING:

A. Scope: Provide grounding system complying with the codes and ordinances specified. Grounding system shall provide continuity through the entire electrical system.

1. Panelboard ground buses.

2. PVC conduit or other raceways.

3. All motors.

4. All lighting fixtures.

5. Grounding terminals of all receptacles.

6. Miscellaneous grounds required by code.

B. Equipment and raceway bonding procedures shall be rigidly maintained and meet all jurisdictional requirements of codes and regulations.

C. Good, electrically continuous, metal to metal contacts shall be made wherever possible at all panel boxes, pull boxes, etc. Where it is not possible to obtain good contacts, the conduit shall be bonded round the boxes with a 6 BS gauge, rubber covered, double braided wire with ground clamps.

D. A separate grounding conductor shall be run in all conduit runs from distribution, lighting, and power, etc. panelboards, motor control outlets, etc., back to their respective service or distribution panelboards.

E. Flexible Conduit Grounding: Provide a separate grounding conductor in all flexible conduit runs to include watertight flexible conduit with integral grounding straps. Install ground conductors inside conduit with ungrounded conductors. Extend from nearest panel to device being connected.

F. Receptacle Circuits: Provide a separate grounding conductor in all receptacle circuit conduit runs, back to serving panelboard.

3.05 INSTALLATION OF MOTOR STARTERS:

A. In finished areas, mount motor protection switches flush and install suitable cover plates.

B. Install heaters correlated with full load current of motors provided.

C. Set overload devices to suit motor provided.

3.06 CONNECTIONS TO NEW MANHOLES

Construct concrete-encased duct lines connecting to underground structures to have a flared section adjacent to the manhole to provide shear strength. Construct underground structures to provide for keying the concrete encasement of the duct line into the wall of the structure. Use vibrators when this portion of the encasement is poured to ensure a seal between the encasement and the wall of the structure.

3.07 CONNECTIONS TO EXISTING MANHOLES

For duct line connections to existing structures, break the structure wall out to the dimensions required and preserve steel in the structure wall. Cut steel and bend out to tie into the reinforcing of the duct line encasement. Chip out the structure wall to form a key for the duct line encasement.

END OF SECTION

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SECTION 26 50 00

LIGHTING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Included: Furnish and install lighting fixtures including lamps; connect fixtures to circuits, occupancy sensors, relays, room controllers, contactors, control panels, and gateways, where applicable.

B. Related Work:
   1. Common Work Results for Electrical: Section 26 05 00.
   2. Low Voltage Electrical Transmission: Section 26 20 00.

1.02 SUBMITTALS

A. All submittals shall be made in accordance with Division 1 Submittal Procedures.

B. List of Materials: Submit a complete list of material proposed for this Section.

C. Shop Drawings for Lighting Fixtures: Provide detailed and dimensioned working drawings showing kind, weight and thickness of materials, method of fitting and fastening parts together, location and number of sockets, size and color of lamps, and complete details of the method of fitting, suspension and securing the fixtures in place. Drawings shall contain sufficient information to enable a workman to construct and install the fixtures without further instructions.

D. Shop Drawings for Lighting Controls: Provide detailed and complete wiring diagrams and plans for lighting controls. Provide cut sheets for lighting control devices and cabling.

1.03 MOUNTING REQUIREMENTS

Comply with State of California earthquake requirements and CEC requirements for lighting fixture installations and support.

1.04 GUARANTEE

A. Guarantee lighting components against service failure for five years. Indicate installation date on each driver by inscribing month, day and year on the housing.

PART 2 – PRODUCTS

2.01 MATERIAL AND FABRICATION

A. Each lighting fixture shall be the type indicated on the drawings and as specified herein. Fixtures of the same type shall be of identical make, design and appearance. The size of each lighting fixture shall be as specified herein for the lamp or fixture wattage indicated on the drawings.

B. The design of all lighting fixtures, accessories and supports, as well as the method of hanging fixtures, shall comply with all requirements for earthquake resistant construction of the State of California.

2.02 LIGHT FIXTURES

A. LED Drivers: Drivers shall be electronic type specifically designed to save energy while maintaining full light output. Drivers shall have "A" sound rating, thermal protectors and guaranteed against service failure for three years. Drivers shall comply with FCC and NEMA limits governing electromagnetic and Radio Frequency Interference and meet all applicable ANSI, State and Federal standards. The contractor shall indicate the installation date on each driver by inscribing the month, day and year on the ballast case. Drivers shall be noiseless, high power factor type and shall be ETL certified under CBM Standards and Underwriters' Laboratory listed.

B. LED Diodes shall have the following minimum characteristics:

1. Efficacy – 110 lumens per watt or greater

2. Color rendition index – 80 or greater

3. Standard deviation color matching for diodes shall fall within 1 MacAdam ellipse.

2.03 LIGHTING CONTROLS

A. Lighting controls and control systems shall meet all requirements of the State of California Title 24 energy code.

B. Lighting control systems shall be commissioned by a factory lighting commissioner. Commissioning by the contractor is not acceptable.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install lighting fixtures where shown on plans.

B. Fixture voltage shall be as shown on drawings and in the fixture schedule.

C. Install recessed and surface-mounted fixtures with mounts or plaster frames compatible with the ceiling and wall systems employed and secure fixtures mechanically to frames.

D. Align rows of surface-mounted fluorescent fixtures to form straight lines at uniform elevations. Provide factory joiner bands for contiguous fixtures, and end caps on ends.

E. Recessed fixtures shall fit snugly against ceilings to prevent light leakage.

F. Support suspended recessed fixtures in a T-bar ceiling as follows: All fixtures shall be attached to the ceiling grid to resist a horizontal force equal to the weight of the fixtures. For heavy duty grid systems, fixtures weighing less than 56 pounds must also have two 12 gauge slack safety wires from diagonal corners to the structure above; fixtures weighing more than 56 pounds shall be independently supported by not less than 4 taut No. 12 gauge wires capable of supporting four times the load. For intermediate duty grid systems, fixtures shall be independently supported by not less than four taut No. 12 gauge wires capable of supporting four times the load. All fixture hanger wire ends shall be twisted three tight turns within a 2" distance. Fixture installation shall be coordinated with the acoustical ceiling installation.

G. Light Pole Installation:

1. Set in concrete footings; set poles plumb and straight. Grout and drypack after leveling poles. Concrete, grout and drypack are specified under Section 03 30 00, Cast-in-Place Concrete.

2. Electrically ground the fixtures and poles.

3. Solder and tape splices as required for the floodlight fixture installations.

4. Each standard shall be tapered galvanized steel, with handhole, anchor bolts, fixture mounting brackets and all accessories.

5. Poles shall be designed to withstand a minimum wind velocity of 80 mph sustained, 104 mph gusts.

H. Provide factory commissioning for lighting controls and devices. The completed installation shall comply in every way with the requirements of Title 24.

3.02 CLEANING

A. Clean surfaces of all dirt, paint, cement, plaster and other debris. Use cleansers compatible with material surfaces being cleaned.

B. Clean lenses, reflectors, and the like of dust, fingerprints, and grime.

3.03 TESTING

A. Check and adjust fixtures for even illumination.

B. Replace defective fixtures and fixture components with new.

C. The lighting control system shall be acceptance tested by an independent company. The agent shall not be an employee of or affiliated with the contractor. The contractor is responsible for passing the acceptance tests.

END OF SECTION

SECTION 27 00 00

COMMUNICATIONS

PART 1 – GENERAL

1.01 RELATED SECTIONS

A. This specification section provides general conditions for all division 27 specifications. All contractors working with in the division 27 specification shall adhere to this specification.

1.02 STATEMENT OF WORK

A. This document describes the requirements for the contractors, products and installation relating to furnishing and installing Structured Cabling and Communications Systems.

B. Contractor will provide a bid including all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in this Document. It is the responsibility of the Contractor to provide all material necessary to provide a complete and operable system. If the contractor feels that the system described is incomplete they must address this in writing to the Owner/Owner's Representative before providing a bid.

C. All questions concerning non-specified product and services will be address to the Owner's Representative before Contactor provides a bid. Owner expects that by accepting the Contractor's bid proposal that the Contractor has provided a competent bid for a complete solution.

D. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of devices, typical installation details, and mounting details will be provided as an attachment to this document. The successful vendor shall meet or exceed all requirements for the systems described in this document.

E. 271000 contractor shall be complete with work including all testing and labeling prior to 272000 contractor work start. Also the owner requires minimum of 10 days to review test documents prior to network start up.

F. 272000 contractor will require that 271000 is complete prior to work start. 272000 will need minimum of five day burn in of network equipment prior to turnover to owner.

1.03 REGULATORY REFERENCES

A. Contractor will comply will all Federal, State, Local Codes/Regulations and Industries Standards.

1. Federal:

- FCC - Part 15, Part 68
- ADA – Americans with Disabilities Act

2. State of California:

- CCR Part 2 - California Building Code 2013
- CCR Part 3 - California Electrical Code 2013
- Occupational Safety and Health Act (OSHA).
- Title 24, Building Standards, State of California.
- Title 19, California Code of Regulations.
- Title 8, Electrical Safety, State of California

3. ANSI Standards

- ANSI C2-2001 National Electrical Safety Code.
- ANSI C80.3 Specification for Zinc-coated Electrical Metallic Tubing.
- ANSI/UL 797 Electrical Metallic Tubing.
- ANSI/ICEA S-83-596-2001 - Fiber Optic Premises Distribution Cable Technical Requirements.

4. Industry Standards:

- Telecommunications Industry Associations/Electronics Industry Association (TIA/EIA)
  TIA/EIA-568-C Commercial Building Telecommunications Cabling Standard
  TIA/EIA-568-C.1 General Requirements
  TIA/EIA-568-C.2 Balanced Twisted Pair Cabling Components Standard
  TIA/EIA-568-C.3 Optical Fiber Cabling Components Standard
  TIA/EIA-569-A Commercial Building Standard for Telecom Pathways and Spaces
  TIA/EIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
  TIA/EIA-607 Commercial Building Grounding/Bonding Requirements
  TIA/EIA-758 Customer-Owned Outside Plant Telecommunications Cabling Standard
  TIA/EIA-758-1 Addendum No. 1 to TIA/EIA-758, Customer-Owned Outside Plant Telecommunications Cabling Standard
- National Electrical Manufacturer's Association (NEMA)
- Institute of Electrical and Electronic Engineers (IEEE)

802.3 (Ethernet)
802.3ab (Gigabit Ethernet over 4-pair Category 5e, 6 & 6A or higher) 802.3Z (Gigabit Ethernet over optical fiber)

- Underwriters Laboratories Inc. (UL)
- International Organization for Standardization/International Electromagnetic Commission (ISO/IEC) ISO 11801 Generic Cabling for Customer Premises
- Building Industry Consulting Services International (BICSI) Telecommunications Distribution Methods Manual (TDMM 12th Edition or latest).
- ASCII - American Standard Code for information Interchange
- ASTM - American Society for Testing and Materials

B. If there is a conflict between applicable documents, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

C. This document does not replace any code, either partially or wholly. The contractor must be aware of and comply with all local codes that may impact this project.

1.04 SAFETY/CONTRACTOR QUALIFICATIONS/QUALITY ASSURANCE

A. Safety and Indemnity

1. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of persons and property during performance of work.

2. The Contractor shall ensure that all personnel working in or anywhere on the site shall be provided a hard hat, safety shoes, a face shield or safety goggles, etc. for their protection.

3. No act, service, drawing review or construction observance by the owner's representative or any other party employed by the campus is intended to include review or approval of adequacy of the Contractor's safety measures, in, on or near the construction site.

B. Contractor Qualifications

1. Each low voltage contractor/sub-contractor shall submit their qualifications to the owner prior to award of contracts.

2. Contractor shall have been in business for no less than five (5) years and have installed of a minimum of 3 projects of similar size and

scope.

3. A Manufacturer Certified Installer contractor shall complete the System installation. The contractor shall have completed standards based product and installation training. A copy of the Contractor's Manufacturer Certified Installer certificate shall be submitted with their submittal.

4. Sub-Contractor Qualifications

- All Contractors shall submit a list of at least three (3) projects of similar dollar volume completed within the past 24 months for reference purposes.
- The Contractor shall compile detailed information relating to similar work completed, including corporate references sufficient to enable the Owner to evaluate and agree to the Contractors' responsibility, experience and capacity to perform the work.
- Each Contractor to perform telecommunications work on this project shall possess a C-10 or C-7 (formerly C-61) Limited Specialty License for Telecommunications and must be certified for the installation, termination, splicing, and testing of copper cables, fiber optic cable, riser cable, and inside wiring. The appropriate contractor's license for underground construction and conduit installation is also required.
- An on-site Contractor superintendent must be available at all times. Contact can be by person or telephone.

5. Contractors who do not meet the minimum specified requirements will not be accepted.

C. Quality Assurance: Contractors are required to comply with the following without exception:

1. The winning Contractor will assign this project to a competent Project Manager who has demonstrated their ability to supervise a telecommunications project of the same size and scope.

- The contractor will make this person available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.
- Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Owner.
- Project Manager will be required to be available to meet on site with the Owner/Owner's representative with a minimum of 24 hours' notice for non- emergency issues, and a minimum of

4 hours for emergency issues at no additional cost to the Owner.

2. All material and equipment to be installed on this project shall be "new". If the Owner/Owner's Representative discovers that "used" material or equipment has been installed on this project the Contractor will be required to replace said materials and/or equipment with "new" products at no additional cost to the Owner.

   - "New" - Materials and products manufactured within one (1) year prior to installation, and meet or exceed the latest published specifications of the manufacture. Also these materials and equipment may not have been in use before installation on this project unless directed otherwise in the project documents.

3. Contractor must warranty all materials, equipment and labor for a minimum of one (1) year from the Owner's acceptance of the work.

   - Warranty will provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including Labor, drive time, shipping, taxes, etc.).
   - Contractor is required to keep in stock replacement parts for all items covered in this specification and provide a competent service technician to be on site to repair/replace defective items no later than 24hours after receiving trouble call.
   - Warranty will cover normal Business hours, 8am – 5pm, Monday thru Friday. All calls received on a Friday or the day before a holiday will be held until the following regular business day.

1.05 SUBMITTAL DOCUMENTATION

A. The successful contractor shall provide their submittal package in accordance with the Section 01 20 00 1.06 Submittal Schedule

B. The successful contractor shall provide three (3) copies of their submittal package.

C. The Submittal Package will include:

1. All documentation given will be in a Bond Cover or in a Three (3) Ring Binder.

2. A coversheet on the Contractor's Company Letterhead including:

   - Contractor's Name

- Contractor's License Number
- The Project Name
- The Specification Number and Description
- The date documentation was submitted.

2. A spreadsheet with a full material list of products and equipment included in the Contractor's bid price. Spreadsheet will provide:

   - Manufacture Name
   - Part Number
   - Description
   - Quantity to be installed for each part.

3. A legible copy of the Manufacturer's Catalog Cut sheet for each part included in the Contractor's bid.

   - The Catalog Cut sheets shall be placed in the same order as shown on the spreadsheet.

4. Copies of the Manufacturer's Certification for a minimum of the Project Forman and 50% of the installation crew.

5. Sample of Labeling Scheme. Contractor will provide a sample for each identifier to be used on this project.

D. LEED/CHIPS/HPSA (when applicable to project provide additional submittal information)

1. Recycled content, segregated by pre- and post-consumer percentages.

2. Rapidly renewable material content.

3. VOC content

4. Distances from site to follow material process locations.

   - Raw material harvest, collection or extraction
   - Product or component fabrication
   - Final material manufacture, if different than component fabrication

1.06 EQUIVALENT PRODUCTS

A. Pre-Approved Equals:

1. All pre-approved products shall be listed in the relevant specification section.

B. Contractors wishing to approve a system other than those specified in this document will be required to perform the following:

- Provide System specifications and cut sheets for all system components for the proposed new system(s).
- Provide an itemized comparison to each of the system functions as described in this specification. Include in that document how the proposed system compares to the specified system described in this document on a line by line basis, using one of the following three criteria: "exceeds"/"matches"/"unequal".

C. All other products than those specifically address in the bid document that the Contractor is seeking approvals for must be ***received*** by the Owner's Representative ***no later than 5 business days before the bid date***. All Approved Equals will be published in addendum form prior to the bid date.

D. Failure to received written approval for product installed that deviates from the products called for in this specification and/or on the project drawings will result in the contractor having to replace the unapproved materials and equipment with the originally specified products at no additional cost to the Owner.

E. All proposed system documentation must be sent to the Owner's Representative via one of the following; mail, fax or email. The Contractor will include the project name, their contact information, and the specification section number that the proposed system is comparable to.

1.07 ACCEPTANCE AND WARRANTIES

A. Project Acceptance

1. The Owner and the Contractor shall accept the project as complete based on the following criteria:
   - Before executing any performance testing, the Contractor shall present a test plan to the Project Engineer for their approval.
   - The Contractor has completed all testing and delivered copies of all test results to the owner's representative.
   - All test results have been examined and approved by the Contractor and the Project Engineer.
   - Copies of all documentation required by this section have been delivered to the Project Engineer.
   - All punch list items are completed to the satisfaction of the Inspector-of- Record.
   - Manufacturer Warranty Certification Certificates are provided to the Owner.

2. Following completion and/or compliance with the requirements listed above, the Contractor shall issue a Notice of Completion confirming that the project is complete. A 45-day acceptance period shall begin immediately following the issuance of the Notice of Completion.

3. Minor failures shall be responded to at the Owner's discretion or within one business day.

B. Manufacturer Warranties

1. The installed 271000 structured wiring (as applicable for given cable media) system, including both inter-building and intra-building sub-systems, shall be warranted by a manufacturer for a 15-year period or greater. Lifetime warranty is the warranty period preferred by the Owner.

2. The warranty certified systems will be a complete system comprised of products from a single solution manufacturer, warranted to operate as a guaranteed system for the entire channel (cords, telecommunications outlet/connectors, cables, cross-connects, patch panels, etc.). The Solution Manufacturer shall administer a follow on program through the Vendor to provide support and service to the purchaser, and a single extended warranty point of contact. In the event that the certified system ceases to support the certified application(s), whether at the time of cutover, during normal use or when upgrading, the manufacturer and vendor shall commit to promptly implement corrective action.

3. The Contractor shall be responsible for correcting any problems and malfunctions that are warranty-related for the entire warranty period. In the event that a Contractor should not be in business at the time of an issue, the manufacturer shall be responsible for all corrections, if deemed the responsible party.

4. Copies of any extended material warranties shall be passed through to the Owner.

5. During the installation and up to the date of final acceptance, the Contractor shall protect all finished and unfinished work against damage and loss. In the event of such damage or loss, the Contractor shall replace or repair such work at no cost to the Owner or any other Trade Partnership working on the project.

END OF SECTION

SECTION 27 10 00

STRUCTURED CABLING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This document describes the requirements for the contractors, products and installation relating to furnishing and installing a Structured Cabling Plant.

B. The Cabling System as described in this document is comprised of cabling, infrastructure and termination hardware to provide an approved TIA/EIA Data Networking and Voice Communication Structured Cabling System.

C. Provide all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in the Specifying Documentation.

D. 271000 contractors shall be complete with work including all testing and labeling prior to 272000 contractor work start. Also the owner requires minimum of 10 days to review test documents prior to network start up.

1.2 CONTRACTOR QUALIFICATIONS/QUALITY ASSURANCE

A. Safety and Indemnity

Contractors will submit the necessary documentation to demonstrate their compliance with Section 270000 "1.5 A. Safety & Indemnity".

B. Contractor Qualifications

Contractors will submit the necessary documentation to demonstrate their compliance with Section 270000 "1.5 B. Contractor Qualification".

C. Quality Assurance

Contractor shall comply with all requirements as specified in Section 270000 "1.5C Quality Assurance".

D. Warranty

1. Contractor shall comply with all requirements as specified in Section 270000 "1.8. Acceptance & Warranties".

2. The bid package shall be accompanied by a warranty commitment binding the awarded contractor and manufacturer to a Lifetime Structured Cabling Warranty with guaranteed performance criteria set forth in this document and/or set forth by the Manufacturer. Contractor must be trained and certified in the installation of the Manufacturer system proposed. Contractor shall submit proof of current certification in the Certified Installer Program as a Premier or Authorized Network Installer in order to install and fully warrant the Cabling System. Copy of current Certificate must be included in Proposal if not already on file with Architect/Consultant/Owner.

3. A Lifetime warranty (or 25yr minimum) for the structured cabling system shall be provided for an end-to-end permanent link model installation which covers the performance of the cable, connecting hardware and the labor cost for the repair or replacement of the link.

4. Links failing test parameters or producing marginal pass results will be retested or replaced at Contractor expense until link test results passing TIA/EIA Standard parameters for the category rating or better are achieved.

5. Warranty application is to be submitted in advance of the project start, and full test reports shall be delivered to Manufacturer within 15 days of project completion. Lifetime Manufacturer warranty processing is to be completed by Contractor and warranty certificate delivered to owner upon project completion.

1.3 SUBMITTAL DOCUMENTATION

A. The successful contractor shall provide their submittal package in accordance with the Section 01 20 00 1.06 Submittal Schedule, and Section 270000 "1.6 Submittal Documentation".

1.4 EQUIVALENT PRODUCTS

A. All Products Leviton, Berk-Tek, Superior Essex, and Chatsworth form the basis of design for this Specification. Part numbers, where provided, exemplify the feature set expected to be provided for this Structured Cabling Plant.

B. Pre-Approved Equals:

1. None, all alternate materials must be submitted for approval prior to bid.

C. Structured cabling manufacturer system warranties shall be Limited Lifetime or 25year.

D. Contractors wishing to approve a system other than those specified in this document shall do so in accordance with Section 270000 "1.7 Equivalent Products".

PART 2 – PRODUCTS

2.1 WORK AREA SUBSYSTEM

A. The Work Area shall consist of the connectivity equipment used to connect the horizontal cabling subsystem and the equipment in the work area. The connectivity equipment shall include the following options:

- Patch Cords
- Modular Inserts and Jacks
- Faceplates

B. Modular Inserts and Jacks

1. Category 6 Keystone Jack

- Jacks must exceed the Category 6 standard, and must be Component-Rated for performance.
- Jacks shall be 8-position 8-conductor RJ45-style and must have "retention- force technology" or equivalent feature to prevent time damage over the life of the jack regardless of use
- Jacks shall be 8 position un-keyed
- Jack shall be rear-terminated industry- standard 110 IDC. Lead-frame jacks shall not be used in this Cable Plant.
- Jacks shall have a designation indicating Category 6 on the nose which can be plainly seen from the front of the faceplate. Bottom of jack shall have date code.
- Jacks shall utilize a paired punch down sequence. Cable pair twists shall be maintained up to the IDC, terminating all conductors adjacent to its pair mate to better maintain pair characteristics designed by the cable manufacturer.
- Jacks shall terminate 22-26 AWG stranded or solid conductors.
- Jacks shall be compatible with single conductor 110 impact termination tools.
- Jacks shall have an attached color coded wiring instruction label housed between the IDC termination towers.
- Jacks shall be manufactured in the USA

- Jacks shall be compatible with TIA/EIA 606 color code, and have removable high-visibility color labels designating pair locations. Split-colored T568A/B labels are not approved.
- Jacks shall utilize pair-separation towers for ease of untwisting pairs, and shall employ a snap-on rear termination cover designed for suppression and isolate of cross-talk of neighboring connectors.
- Jacks will be terminated according to theT568B wiring scheme.
- Color:
  Data Jacks will be BLUE
  Voice Jacks will be WHITE Wireless Jacks will be YELLOW A/V Jacks will be GRAY Camera Jacks will be PURPLE
- Quantity: Contractor will provide and install one jack for every outlet cable shown on the drawings.
  Part#:
  Data Jacks will be 61110-RL6 Voice Jacks will be 61110-RW6 Wireless Jacks will be 61110-RY6 A/V Jacks will be 61110-RG6 Camera Jacks will be 61110-RP6

C. Wall Mount and Modular Furniture Faceplates

1. Wall Plates

- Faceplates shall be UL Listed and CSA Certified
- Faceplates shall be 2.75" W x 4.5" H (69.8 mm x 114.3 mm)
- Faceplates shall provide for TIA/EIA 606 compliant station labeling.
- Faceplates shall have plastic covers over the mounting screws that can be replaced with a clear plastic window over a printable paper insert.
- Faceplates shall have an industry-standard KEYSTONE opening style, and shall accept any Keystone modular insert.
- Faceplates shall be made in the U.S.A.
- Color: Faceplate to be WHITE
- Quantity: Contractor will provide and install one single gang faceplate for each outlet shown on the drawings.
- Part#:
  6 Port Face Plate, PN# 42080-6WS
  4 Port Face Plate, PN# 42080-4WS 2 Port Face Plate, PN# 42080-2WS

2. Blank Insert

- Color: Blank Insert to match device place or raceway.
- Quantity: Contractor will provide and install one insert for every unused port in a faceplate.

- Part#: 41084-B*B (*=W for WHITE, I for IVORY)

3. Blank Wall Plates

- Faceplate shall be constructed from stainless steel.
- Faceplates shall be UL Listed and CSA Certified
- Faceplates shall be 2.75" W x 4.5" H (69.8 mm x 114.3 mm) for single gang.
- Color: Faceplate to be STAINLESS STEEL
- Quantity: Contractor will provide and install one faceplate for each unused data/voice/video/intercom outlet shown on the drawings.
- Part#: 84014-40

4. Surface Mount Raceway Insert
Inserts for Wiremold's 4050, 5450 and 5550 Device Mounting Brackets

- Insert shall allow for two category 6 jacks to be mounted flush.
- Insert shall match the color of the Raceway installed.
- Color: Faceplate to be IVORY
- Quantity: Contractor will provide and install one 2-port insert for each outlet in the Surface Mount Raceway shown on the drawings.
- Part#: Equal to Wiremold, PN# 5507FRJ

2.2 HORIZONTAL DISTRIBUTION CABLING

The horizontal distribution cabling system is the portion of the telecommunications cabling system that extends from the Work Area (WA) telecommunications outlet/connector to the horizontal cross-connect in the Telecommunications Room (TR).

- Cabling Support System
- Copper Station Cabling
- Copper Cross-Connect Cabling

A. Copper Station Cable

1. Category 6 Unshielded Twisted Pair (UTP) Cable

- Cable will meet or exceed the proposed requirements of ANSI/TIA/EIA 568- C.2, 568-B.2 Addendum #1 and ISO/IEC 11801 Category 6 Cable Standard for: NEXT and ELFEXT (Pair-To-Pair and Power Sum), Insertion Loss (Attenuation), Return Loss, and Delay Skew.

- Cable shall be proven to support Gigabit Ethernet / 1000BASE-T / IEEE 802.3ab, ATM up to 155 Mbps, IEEE 802.3af Power Over Ethernet for VoIP, 100 Mbps Fast Ethernet / 100BASE-T / IEEE 802.3, ANSI.X3.263 FDDI TP- PMD, Ethernet / 10BASE-T / IEEE 802.3, 4 & 16 Mbps Token Ring / IEEE 802.5, T1/E1, xDSL, ISDN, 550 MHz Broadband Video and standards under development such as ATM at 622 Mbps, 1.2 and 2.4 Gbps.
- The cable shall consist of four unshielded twisted pairs of thermoplastic insulated bare copper enclosed in a thermoplastic jacket.
- All cable shall conform to the requirements for communications circuits defined by the California Electrical Code (Article 800) and the Canadian Building Code. Cable listed to CEC Article 800-51(a) will be used for "Plenum" installations. Cable listed to CEC Article 800-51(b) shall be installed in vertical runs penetrating more than one floor.
- Cable shall have been certified with the UL 1666 Vertical Tray Flame Test.
- Cable shall be available in a Plenum, Riser and Indoor/Outdoor rated jackets.
- Contractor will use the indoor/outdoor rated cable for all locations where the cable pathway goes underground and/or run in exterior conduit.
- Cables shall be made in the U.S.A.
- The listed Category 6 cables in this specification are manufactured by Berk-Tek unless otherwise noted.
- Color:
  Data cable jacket will be BLUE
  Data cable for Security Cameras will be PURPLE
- Quantity: See Drawing for quantity and installation details.
- Part#:
  <u>For Riser Application:</u>
  Berk-Tek PN# 10136339
  <u>For Plenum Application:</u>
  Berk-Tek PN# 10136226
  <u>For Indoor/Outdoor Application:</u>
  Mohawk CDT PN# M58772 (all cable jackets will be BLACK)

B. Horizontal Copper Cross-Connect Cabling

1. Voice Cross-Connect Cabling

- Cable shall meet and/or exceed the UL Listed Type CMR and the ANSI/ICEA S-80-576 standard.
- Cables shall be made in the U.S.A.
- Core Construction

- Conductors: Solid-copper conductors, 24 AWG.
- Insulation: Flame retardant semi-rigid PVC.
- Core Assembly: Cable core will be made up of 100 pair units consisting of four (4) 25 pair sub-units. Each group individually identifiable by color coded unit binders.

- Jacket: Gray, flame retardant PVC jacket.
- Color: Voice cable jacket will be GRAY
- Quantity: See Drawing for quantity and installation details. The number of 25-pair cable between the MDF and the IDF shall be derived by multiplying the number of pairs required for the cross-connect by 1.25 to the nearest 25-pair increment.
- Part#:

Superior Essex Cable:	Berk-Tek:
25 pair = PN# 18-475-33	10032396
50 pair = PN# 18-579-33	10032471
100 pair = PN# 18-789-33	10032472

2.3 BACKBONE CABLING

The backbone cabling system is the portion of the telecommunications cabling system that extends from the Intermediate Distribution Frame (IDF) to the Main Distribution Frame (MDF).

A. Fiber Optic Backbone Cabling - Singlemode

1. Cable Construction:
   a. Tight Buffered
   b. Dry water-blocking tape.
   c. Epoxy glass central strength member.
2. Jacket Material: Flame retardant UV stabilized , OFNP rated
3. Fiber Count: As indicated on Drawings (single mode/multimode).
4. Fiber Type:
   a. Single-mode: 8.2/125.
   b. Color coded 250 micron fibers.
5. Color Code: TIA/EIA-598-A, Optical Fiber Cable Color Coding.
6. Maximum Pulling Tension:
   a. Up to 12 strand: 1335 N (300 lb/f) during installation, 400 N (90 lb/f) installed
   b. 18 strand and above: 2670 N (600 lb/f) during installation, 801 N (180 lb/f) installed
7. Storage Temperature: -40 to +70 degrees C (-40 to +158 degrees F).
8. Installation Temperature: 0 to +60 degrees C (+32 to +140 degrees F).
9. Operating Temperature: -40 to +70 degrees C (-40 to +158 degrees F).

10. Cable shall be UL/cUL OFNp/OFN FTA (Plenum) rated and be Flame Resistant in accordance with the UL 1666.
11. Cable shall be constructed utilizing a loose tube design.
12. Cable will maintain the following:
    a. Crush Resistance (EIA-455-41) = 2000 N/cm
    b. Impact Resistance (EIA-455-25) = 2000 Impacts w/1.6 N-m
    c. Min Bend Radius, Long Term - No Load = 15x Cable diameter; Short Term – Load = 20x Cable diameter
13. The Fiber Optic Cable in this specification is manufactured by Berk-Tek
14. Singlemode Fiber cables shall be pre-terminated in 12-strand MTP connectors, with factory-attached pulling head. Cables shall not be pulled through flooded or muddy conduits. Mandrel all conduits prior to pulling.
15. Color: Fiber Optic cable jacket will be Aqua
16. Quantity: See Drawing for quantity and installation details.

B. Fiber Optic Backbone Cabling - Multimode

1. Cable Construction:
    a. Tight Buffered
    b. Dry water-blocking tape.
    c. Epoxy glass central strength member.
2. Jacket Material: Flame retardant UV stabilized , OFNP rated
3. Fiber Count: As indicated on Drawings (single mode/multimode).
4. Fiber Type:
    a. Single-mode: 8.2/125.
    b. Multimode: 50/125 Laser-Optimized OM3 capable of 1 Gigabit Ethernet Link at 1000m/600m (@850nm/1300nm) 10 Gigabit Ethernet Link at 300m/300m (@850nm/1300nm)
    c. Color coded 250 micron fibers.
5. Color Code: TIA/EIA-598-A, Optical Fiber Cable Color Coding.
6. Maximum Pulling Tension:
    a. Up to 12 strand: 1335 N (300 lb/f) during installation, 400 N (90 lb/f) installed
    b. 18 strand and above: 2670 N (600 lb/f) during installation, 801 N (180 lb/f) installed
7. Storage Temperature: -40 to +70 degrees C (-40 to +158 degrees F).
8. Installation Temperature: 0 to +60 degrees C (+32 to +140 degrees F).
9. Operating Temperature: -40 to +70 degrees C (-40 to +158 degrees F).
10. Cable shall be UL/cUL OFNR/OFN FTA (Riser) or OFNP (Plenum) rated and be Flame Resistant in accordance with the UL 1666.
11. Cable shall be constructed utilizing a loose tube design.
12. Cable will maintain the following:

a. Crush Resistance (EIA-455-41) = 2000 N/cm
b. Impact Resistance (EIA-455-25) = 2000 Impacts w/1.6 N-m
c. Min Bend Radius, Long Term - No Load = 15x Cable diameter; Short Term – Load = 20x Cable diameter

13. The Fiber Optic Cable in this specification is manufactured by Berk-Tek
14. Color: Fiber Optic cable jacket will be Aqua
15. Quantity: See Drawing for quantity and installation details.

C. Fiber Optic Terminations – Trunk Cabling

1. Optical fiber cable trunks shall have a breakout of 3 feet. All fiber trunks shall utilize a heat shrink at the ends of all breakouts to create a smooth breakout of the fiber subunit legs
2. All Singlemode optical fiber cables shall utilize the 12-strand MTP connector. 24-strand cables shall have (2) 12-strand Singlemode MTP cables factory terminated at both ends.
3. All Multimode optical fiber cables shall utilize the 24-strand MTP connector.
4. Optical fiber trunks shall utilize female MTP connectors. Pinned and generic-style MPO connectors are not acceptable quality.
5. All Fiber Optic Trunks shall utilize Method B Polarity.
6. All optical fiber cabling trunks shall have a unique identifying label with a bar code for quick identification. The label shall state Manufacturer, trunk length and serial number.
7. A pulling eye shall be installed on all trunks to help facilitate installation of the trunk. Trunks over 125' shall be provided on wooden reels.
8. The contractor shall be responsible for the correct fiber trunk lengths, configuration, and ordering. Fiber Trunk part numbers shall be generated at www.Leviton.com/Configurator (Online) and must be verified by Manufacturer prior to ordering..

Approved Products:

Leviton Unity Part # FT-EB024JJ100F38C38CY-YYBS (sample part #, actual part # TDB as required)

Where:

FT	Fiber trunk
E	OM3 (use A for OS2 Singlemode)
B	Dry loose tube OFNP Plenum (use A for OFNR)
024	24-strand
JJ	Female 24-strand MTP on each end (use LL for 12-strand MTP breakout)
100F	100' (use 3-digit length and M for meters)
38	38" breakout

C 3mm jacketed fiber breakout leg
38C same
Y Pulling eye Yes (or N)
YY staggered ends, 1st and 2nd end both (NN, YN, NY options)
B Method B polarity
S Standard labeling

D. Copper System Backbone Cabling

1. Voice System Backbone Cabling

a. Cable shall meet or exceed those specified in RUS Bulletin 1753F-208 (REA PE-89)
b. Cables shall be made in the U.S.A.
c. Core Construction
- Conductors: Solid, annealed copper, 24 AWG unless otherwise noted on design documents.
- Insulation: Dual insulation consisting of an inner layer of foamed polyolefin skin, colored coded in accordance with industry standards
- Core Assembly: Cables of 25 pairs and less formed by assembling pairs together in a single group. Cables of more than 25 pairs formed by twisted pairs arranged in groups with each group having a color coded unit binder.
- Filling Compound: The entire core assembly completely filled with ETPR compound, filling the interstices between the pairs and under the core tape.
- Core Wrap: Non-hygroscopic dielectric tape applied longitudinally with an overlap.
- Sheath Construction
- Aluminum Shield: Corrosion protected plastic coated, corrugated 0.008" aluminum tape.

d. Jacket: Black, linear low-density polyethylene.
e. Color: Voice cable jacket will be BLACK
f. Quantity: See Drawing for quantity and installation details. The number of 25-pair cable between the MDF and the IDF shall be derived by multiplying the number of pairs serving the individual telephone handsets by 1.25 to the nearest 25-pair increment.
g. Part#: Equal to Superior Essex Cable: 25 pair = PN# 09-097-02
50 pair = PN# 09-100-02
100 pair = PN# 09-104-02
200 pair = PN# 09-108-02

2.4 TELECOMMUNICATION ROOM

The Telecommunication Room (TR) includes those products that terminate horizontal and backbone cabling subsystems and connect then to the network equipment.

- Patch Cords
- Horizontal Cabling Termination Equipment
- Backbone Cabling Termination Equipment
- Cabinets, Racks, and Enclosures
- Cable Support System

A. Patch Cords

1. Copper patch cords for CAT6 UTP user locations shall exhibit the following characteristics:

    - 26-gauge, unshielded, twisted pair, stranded conductor construction with a standard 8-position modular plug on both ends.
    - Plug contacts shall be plated with minimum of 50 micro-inches (µm) of gold
    - Slimline, integrated snag-less molded plug design with integrated strain relief, without incorporating the use of any secondary or 2-piece rubber over-boot.
    - Maximum Outer Diameter of 0.24"
    - Power over Ethernet (PoE and PoE+) compatible
    - Support 1 Gigabit applications over 90-meter permanent links with up to 10 meters of cordage
    - Meets all applicable standards and listings: ANSI/TIA-1096-A (formerly FCC Part 68), RoHS compliant, IEEE 802.3, PoE: IEEE 802.3at – 2012
    - Color: White
    - Provide 1 patch cord (length TBD) for each jack/outlet installed under this Specification.
    - Part #: Leviton Slimline CAT6 Component-rated Patch Cord, White, # 6D460-xxW (where xx = Length, in Feet)

2. Fiber Patch Cords

    - Fiber optic LC-LC patch cords, or jumpers, will make LC connections from the rack termination points to the equipment. The jumpers will meet the following requirements:
    - Factory-manufactured using Singlemode OS2 or Multimode OM3 optical fiber. Field terminations on fiber jumpers are not acceptable.
    - Shall utilize A-B polarity.

- Shall exhibit <0.3 dB insertion loss and -25 dB return loss.
- Shall be available in standard lengths of 1, 2, 3, 5 and 10 meters and custom-orderable up to any length of feet or meters
- Provide factory assembled patch cords meeting or exceeding all criteria specified in the horizontal cabling standard subsection above, in the following quantities and/or as specified in Part 3:
- (2) 2m LC duplex fiber jumper for each duplex port, or 1 patch cord per strand terminated in MDF.
- Verify lengths, quantities and configuration with owner prior to delivery.
- Part #: Leviton LC-LC SM duplex jumper, UPDLC-Sxx; LC-LC Multimode jumper, 5LDLC-Mxx (where xx = Length in Meters)

B. Horizontal Cable Termination Equipment

1. Copper Termination Equipment

a) Data Category 6 Patch Panels

- Panels shall be made of black 16-gauge steel in 24 port configurations.
- Panels shall have optional rear cable support bar for strain relief. Cable support bar shall attach to the rear of the patch panel itself without the use of additional fasteners or screws.
- Panels shall have write-on blocks and port numbers are silk-screened in white.
- Panels shall provide wiring identification & color code and maintain an in-line, paired punch down sequence that does not require the splitting of conductors from individual cable pairs.
- The panel shall accept all QuickPort modules and feature white write-on front labels.
- Panels shall be ANSI/TIA/EIA-568-C.1, C.2 and ISO/IEC 11801 category 6 compliant.
- Panels shall be UL LISTED 1863 and CSA certified.
- Panels shall be made by an ISO 9002 Certified Manufacturer.
- Panels shall be made in the U.S.A.
- Color: Patch Panel shall be BLACK
- Quantity: See Drawing for quantity and installation details. The number of patch panels to be supplied shall be derived by multiplying the number of data/voice cables being terminated at the individual TR by 1.25 and providing additional panels in the nearest 24 port increment.
- Part#:
  Leviton 24-port Category 6 patch panel, angled recessed,

4W256-H24

b) Voice Termination Block (Intercom Backbone and Intercom Devices)

- Pair Capacity 50
- Blocks shall be wall mounted.
- Terminates 22 - 26 AWG (0.81 - 0.41mm) solid insulated cable or 18 - 19 AWG (1.02 - 0.91mm) solid stripped cable
- Blocks shall have stand-off legs included for all locations; S89 series stand- off bracket
- Made from High impact flame retardant thermoplastic
- Height: 254mm (10 in.), width: 86.4mm (3.4 in.), depth: 30.5mm (1.2 in.)
- Part#: Leviton or equal Termination block, 40066-M50 Mounting bracket, 40089-00D

C. Backbone Cable Termination Equipment

1. Connectors

a) Fiber Optic Connectors
- *Anaerobic & Mechanical terminations will not be accepted.*

2. MTP MODULES

a) Fiber optic MTP-MTP configured trunks will land on a 24-strand (12 LC Duplex Port) MTP-LC Cassette module. The modules shall meet the following requirements:
- Insertable directly into fiber enclosure panel openings with a color-indicating push-on lockpin latch.
- Rated for Laser Optimized Multi-mode OM4 optical fiber.
- Shall utilize a male MTP connection.
- Shall utilize Method B Polarity.
- Shall require one Core module at one end of a fiber trunk segment, and one Edge module at the second end to maintain correct polarity across the system.
- Core modules should be placed at the HDA, and Edge modules at the MDA and EDA for consistency of design.
- Part#: Leviton FM-E024CDC0BC Core module, FM-F024CDC0BE Edge module (denotes Method B polarity, 24-fiber MTP, OM3)

3. Fusion-Fiber Pigtail Fusion Splice Module

a) To be utilized only as approved in writing by Owner or Owner's representative, based on field conditions.
- Integrated module adapter bulkhead for 12 or 24 fibers with self-contained splice holders
- Individual compartments provide slack storage and bend radius guides for respective backbone cable, 900µm tight buffer pigtails, and fusion spliced fibers
- 12-fiber color-coded 900µm tight buffer pigtails 1.5m length are pre-loaded in module per specific configuration
- Modular design allows for ease of maintenance of individual spliced fiber and allows for scaling up without impacting existing fibers
- Included accessory kit consists of heat shrink style splice sleeves, tie wraps, and mesh sleeve
- Installs in Leviton's Opt-X rack mount (Ultra, 1000i, and 500i) and wall mount fiber enclosures
- Zirconia ceramic ferrules and sleeves used
- 12-fiber splice module configurations will utilize duplex LC adapters
- 24-fiber splice module configurations will utilize quad LC adapters
- ALL FIBER SHALL BE FUSION SPLICED
- Quantity: See Drawing for quantity and installation details.
- Part #: Leviton or equal
- 12-strand Singlemode, SPLCS-12L
- 24-strand Singlemode, SPLCS-24L
- 12-strand Singlemode Fusion Splice pigtail kit, UPPLC-KIT

4. Fiber Termination Panels

a) IDF Rack Mount Fiber Panel
- Fiber panels shall be constructed of durable polycarbonate plastic and black powder-coated 16-gauge steel
- Panel shall have a sliding tray which removes completely from enclosure to facilitate field terminations and splicing
- Sliding tray with front and rear stop shall glide forward and backward providing accessibility to front and rear of bulkhead after installation
- Panel shall have a 17" depth for high-density fiber termination and/or splicing
- Front saddles shall pivot for improved patch cord routing and organization
- Removable transparent hinged doors and slide-away covers shall allow for easy access during install and visibility of interior after install
- Panel shall employ patch cord bend radius guides to

minimize macro bending
- Stackable and adjustable fiber rings simplify cable management
- Panel shall be no more than 1 rack unit in height and shall hold up to 3 adapter plates.
- Panel shall be Made in the U.S.A
- COLOR: black with translucent blue cover panels
- Quantity: See Drawing for quantity and installation details.
- Part#: Leviton Opt-X Ultra no exceptions
  1U - 5R1UH-S03

b) IDF Wall Mount Fiber Panel
- Panels shall be constructed of cold rolled 16 gauge steel with a black powder paint finish and provide for fully enclosed fiber termination.
- Panel shall have a door design. One door shall be lockable for the "technician side" that secures the incoming and outgoing fiber cables. The second door shall accessible to provide fiber patching as needed.
- Panels shall accept four adapter panels for 24 port configurations.
- Panels shall have a splice tray mounting stud incorporated into the base for mounting of mechanical or fusion splice trays. Panel shall have cable management anchor points and come with cable anchors allowing for the maintenance of the incoming cable with the proper minimum bend radius.
- Panels shall have cable entrance ports on the top and bottom with removable plastic dust covers.
- Color: Fiber Panel will be BLACK
- Quantity: See Drawing for quantity and installation details.
- Part: 5W320-00N

c) MDF Rack Mount Fiber Panel
- Fiber panels shall be constructed of durable polycarbonate plastic and black powder-coated 16-gauge steel
- Panel shall have a sliding tray which removes completely from enclosure to facilitate field terminations and splicing
- Sliding tray with front and rear stop shall glide forward and backward providing accessibility to front and rear of bulkhead after installation
- Panel shall have a 17" depth for high-density fiber termination and/or splicing
- Front saddles shall pivot for improved patch cord routing and organization

- Removable transparent hinged doors and slide-away covers shall allow for easy access during install and visibility of interior after install
- Panel shall employ patch cord bend radius guides to minimize macro bending
- Stackable and adjustable fiber rings simplify cable management
- Panel shall be 2 or 4 rack units in height and shall hold up to 6 or 12 adapter plates, respectively
- Panel shall be Made in the United States
- COLOR: black with translucent blue cover panels
- Quantity: See Drawing for quantity and installation details.
- Part#: Leviton Opt-X Ultra no exceptions
  2U - 5R2UH-S06
  4U - 5R4UH-S12

d) Premise Splice Enclosures – Portable Classroom Distribution
- Modular wall-mount enclosures used to directly splice outside plant or intra- building cables
- Four fusion/mechanical splice trays; 4" Standard Splice Tray, 4" x 11.75" x 0.25" # T4LHS-P06
- Constructed of cold-rolled steel
- ALL FIBER SHALL BE FUSION SPLICED
- CPS-24, Customer Premise Splice Enclosure, empty (2 tray capacity)
- Part#: CPS24-STD

e) Fiber Optic OSP Splice Enclosures
- Used to directly splice outside plant or intra-building cables.
- Accommodates various splice tray designs, Maximum Capacity: 96 single fibers using 5" x 7" and 4" x 7" trays
- Enclosure mode from 16-gauge steel, Hinges shall be Stainless steel
- Two-year limited product warranty.
- Durable powder-coat finish COLOR: Beige
  - Size 16" x 15" x 3.4"
- ALL FIBER SHALL BE FUSION SPLICED
- Part #: Leviton CPS Customer Premise Splice Enclosure, Single Door, 24 Fiber Trays # CPS24-STD
  Injection Molded Mini Splice Tray, Heat Shrink style (accepts standard sleeves), up to 12 fiber splicing # T5PLS-12F
  Splice Tray Mounting Hardware Kit # SPLMT-HKT
  Splice Sleeve, 40 mm # FSSSD-040
  Cable clamp kit # CPCSR-001 & CPCSR-002 Grounding kit # CPGRD-KIT
  Key Locking kit # CPLOK-KIT

5. Copper Termination Panels

a) OSP Protection Panels (Intercom Backbone Headend)
- 16 AWG Powder Coated Steel Construction
- Equipped with an Internal 26 AWG Fuse Link
- External Ground Connectors Accept 6 - 14 AWG Wire
- Industry Standard 5 Pin Design
- Exceeds UL497 Primary Protection Standards
- Stackable with Connection Grommets Included
- 66 Block Accepts 22 - 26 AWG Wire/18 - 19 AWG Stripped Solid Copper Wire
- Color: NA
- Quantity: See Drawing for quantity and installation details.
  Part#: Circa Enterprise inc.
  25 pair block, PN# 1890ECT1-25 50 pair block, PN# 1890ECT1-50 100 pair block, PN# 1890ECT1-100

b) OSP Protection Modules
- 240VDC (RUS Approved)
- Nanosecond response time
- External failsafe mechanism that permanently carbon arrestors grounds the module under sustained high current conditions
- Integrated Test Points
- UL & cUL listed
- Designed to meet or exceed Telcordia standards
- ISO 9002 Certified Manufacturer
- Color: RED
- Quantity: See Drawing for quantity and installation details.
  Part#: Circa Enterprise inc. 4B1SF-240
  **Provide 100% fuse density for all installed Protection Panels.*

c) Voice Termination Block (Intercom Backbone building/TC and Intercom Devices)
- Pair Capacity 50
- Blocks shall be wall mounted.
- Terminates 22 - 26 AWG (0.81 - 0.41mm) solid insulated cable or 18 - 19 AWG (1.02 - 0.91mm) solid stripped cable
- Blocks shall have stand-off legs included for all locations; S89 series stand- off bracket
- Made from High impact flame retardant thermoplastic
- Height: 254mm (10 in.), width: 86.4mm (3.4 in.), depth: 30.5mm (1.2 in.)
- Part#:
  Leviton Termination block, 40066-M50

Mounting bracket, 40089-00D

D. CABINETS, RACKS, AND ENCLOSURES

Contractor will provide the following 'IDF' Enclosures and components based on the number of cables to that will be terminated:

1. Remote Equipment Cabinet

- Remote equipment cabinets shall be manufactured from steel. Each cabinet shall have a rectangular body with a removable top panel and a hinged, locking front door. The door shall be solid (no window) and shall be reversible to open from the right or left side. Each cabinet shall include two keys for the door.
- The cabinet shall be constructed to meet the requirements of a NEMA Type 2 Enclosure.
- The cabinet shall include a minimum of two pairs of 19" wide EIA-310-D compliant equipment mounting rails that can be mounted to the cabinet to align equipment with the top or front of the cabinet or at a 45° angle to the back of the cabinet. The mounting rails shall support 2, 4 or 6 RMU of equipment. The cabinet shall provide space for equipment up to 20" deep when aligned with the top of the cabinet or 4" (100 mm) deep when aligned with the front of the cabinet.
- The sides and bottom of the cabinet shall be pre-punched with combination 3/4" and 1-1/2" conduit knockouts for network cable access. The rear of the cabinet shall have a 4" x 6" opening located near the bottom center of the cabinet for through-the-wall network cable access. Cable tie points shall be located around the interior perimeter on the cabinet's rear panel.
- The sides of the cabinet shall have louvers to permit airflow into and through the cabinet. The bottom of the cabinet shall have a grill to allow the addition of an accessory ventilation fan.
- Rack shall provide for a grounding point per the TIA/EIA 607-A.
- The cabinet shall support 100 lb of equipment. Load bearing capacity shall be stated in the manufacturer's product literature.
- Color: Remote Equipment Cabinet will be BLACK
  - Finish shall be black epoxy-polyester hybrid powder coat paint.
  - Mounting rails are anodized aluminum.
- Quantity: See Drawing for quantity and installation details.
- Part#:
  Remote Equipment Cabinet
  Equal to CPI PN# 13050-723, ThinLine II Wall-Mount Cabinet, 26"

Wide x 36'' High x 12'' Deep Exterior, 19'' EIA x 6 RMU.
Fiber Optic Bracket
Equal to CPI PN# 12955-719
Fan Kit
Equal to CPI PN# 13051-001
15amp Power Kit
Equal to CPI PN# 12934-001
12-24 Rack Screws (bag of 50) Equal to CPI PN# 40605-005
Power Strip with Surge Suppression Leviton 5500-192

2. Wall-mounted cabinets

- Wall-mounted cabinets shall be manufactured from steel sheet.
- Each cabinet will have a rear panel that attaches to the wall, a hinged cabinet body that swings open from the rear panel providing easy access to the rear of equipment and a locking front door.
- The rear panel will provide cable access with pre-punched knockouts, up to 3'', for conduit along the top and bottom edges of the panel. There will also be cutouts in the back of the rear panel so that cables can enter the panel through the wall. The rear panel will provide attachment points for accessory equipment mounting brackets and cable tie points within the panel (cabinet).
- The cabinet body will include a single pair of vertical 19'' EIA equipment mounting rails. The mounting rails will be EIA-310-D compliant with the Universal hole pattern. Mounting holes will have #12-24 threads.
- Mounting rails will be adjustable in depth so that they can be positioned at any point within the cabinet body. The design of all cabinets will allow an additional pair of mounting rails (for a total of two pairs of mounting rails per cabinet) to be added to the cabinet.
- The wall-mount cabinet shall provide a hinge design that attaches the cabinet body and the rear panel and allow the rear panel to be removed during installation. The hinge design will allow the cabinet body to open at least 90°. The hasp used to secure the rear panel and the cabinet body together will assist in drawing the components together during the locking action.
- The cabinet body will include vents that are designed to accept fan kits.
- The front door will be hinged and locking. The front door and rear panel will be keyed alike. The front door will have rounded edges and corners. The cabinet body will allow the front door to be attached so that it will swing open from the right or left.

The cabinet manufacture shall provide an option for a solid or a tinted plexi-glass window front door. The plexi-glass in doors shall be bronze acrylic (not clear) with a UL flammability classification of 94HB or better.

- Finish shall be epoxy-polyester hybrid powder coat (paint).
- The cabinet shall have the option of being delivered fully assembled. All cabinets will include installation hardware (hex lag screws) for wood studs and 50 each #12-24 equipment mounting screws.
- Load bearing capacity for cabinets that wall-mount will be a minimum of 200 pounds per cabinet.
- Cabinets that are wall-mount only will be certified and UL Listed to standard UL 60950 under category NWIN.
- CONTRACTOR TO INSTALL PROFESSIONALY SO OWNER PROVIDED EQUIPMENT FITS IN THE RACK. VERIFY RAILS ARE PROPERLY ALIGNED SO ALL EQUIPMENT FITS (including cables/cords) AND DOORS CLOSE. VERIFY SPACING BETWEEN PANELS IS ADEQUATE FOR EQUIPMENT INSTALLATION.
- Color: Wall Mount Cabinet will be BLACK
- Quantity: See Drawing for size, quantity and installation details.
- Part#:
  Wall Mount Cabinet
  12U Cabinet equal to Chatsworth Products, PN# 11900-724 18U Cabinet equal to Chatsworth Products, PN# 11900-736 26U Cabinet equal to Chatsworth Products, PN# 11900-748
  **Contractor will provide an additional set of mounting rails for each wall mount cabinet, equal to Chatsworth Products PN# 12787-5xx.*
  Wall/Floor Mount Cabinet
  33U Cabinet equal to Chatsworth Products, PN# 13495-760 40U Cabinet equal to Chatsworth Products, PN# 13495-772
  **Contractor will provide an additional set of mounting rails for each wall mount cabinet, equal to Chatsworth Products PN# 13276-7xx.*
  Fan Kit/Filter Kit
  Equal to Chatsworth Products Fan Kit, PN# 12804-701 Equal to Chatsworth Products Filter Kit, PN# 12805-701 Grounding Kit
  Equal to Chatsworth Products, PN# 10610-019 Power Strip with Surge Suppression
  Leviton 5500-192

3. Floor Mount 2-post Racks

- Each rack shall have two L-shaped top angles, two L-shaped base angles and two C-shaped equipment-mounting channels. The rack shall assemble with nut and bolt hardware.

The base angles shall be pre-punched for attachment to the floor.

- Equipment mounting channels shall be 3" (76 mm) deep and punched on the front and rear flange with the EIA-310-D Universal hole pattern, 1-3/4" (44.45 mm) rack-mount spaces (U), to provide 45U, 52U or 58U for equipment. Each mounting space (U) shall be marked and numbered on the mounting channel.
- When assembled with top and bottom angles, equipment-mounting channels shall be spaced to allow attachment of 19" EIA rack-mount equipment. Equipment attachment points shall be threaded with 12-24 roll-formed threads. The rack shall include assembly and equipment-mounting hardware. Racks shall include 50 each combination pan head, pilot point mounting screws.
- The assembled rack shall measure 7' (2.1 m)/84" (2133 mm) high, 8' (2.4 m)/96" (2438 mm) high or 9' (2.7 m)/108" (2743 mm) high; 20.3" (515.9 mm) wide and 15" (381.0 mm) deep. The sides (webs) of the equipment-mounting channels shall be punched to allow attachment of vertical cable managers along the sides of the rack or for rack-to-rack baying.
- Assembly hardware shall electrically bond the top angles, side channels and base angles together when assembled, and there shall be a masked ground attachment point with 1/4-20 threaded studs spaced 5/8" apart on the inside of the side channel to attach a ground lug allowing easy attachment to the Telecommunications Ground.
- The rack shall be rated for 1,000 lb (453.6 kg) of equipment.
- Certifications: Communications Circuit Accessory, DUXR and DUXR7 category, file number 140851
- Material: Steel and aluminum extrusion
- Construction: Bolted assembly, Ships unassembled
- Color: BLACK
- Quantity: See Drawing for quantity and installation details.
- Part#: Chatsworth Products Inc.
  Floor Mount 2-Post Rack CPI# 55053-703
  Vertical Wire Managers
  Equal to Leviton, PN# 8980L-VFR Power Strip with Surge Suppression Leviton 5500-192

4. Floor Mount 4-post Racks

- Four-post frame with threaded mounting holes used to support 19" wide rack- mount communications equipment and shelves
- For indoor use only, in environmentally controlled areas; may not be used

- outdoors, in industrial or harsh environments, or in plenum spaces
- Includes: (1) top pan, (1) bottom pan, (4) mounting channels, (2) base angles, (2) top angles
- Assembly hardware; (100) #12-24 equipment mounting screws
- Equipment Support: Front and rear pairs of 3'' deep C-shaped equipment mounting channels, Fixed in place, 29'' apart front-to-rear, 19'' wide, EIA-310- D compliant hole pattern
- 1-3/4'' high rack-mount units (RMU); RMU spaces are marked and numbered on the channels
- Universal hole pattern, 5/8''-5/8''-1/2'' vertical hole spacing
- Threaded #12-24 equipment mounting holes, Includes 100 each #12-24 equipment mounting screws
- Load capacity: 2000 lb of equipment
- Material:; Aluminum extrusion, Aluminum sheet
- Construction: Bolted assembly, Ships unassembled
- Color: BLACK
- Quantity: See Drawing for quantity and installation details.
- Part#: Chatsworth Products Inc. Floor Mount 4-Post Open Frame Rack CPI# 15053-703
  Grounding Kit 10610-019
  Power Strip with Surge Suppression Leviton 5500-192

5. Floor Mount Cabinets

- Four-post frame with threaded mounting holes used to support 19'' wide rack- mount communications equipment and shelves
- For indoor use only, in environmentally controlled areas; may not be used
- outdoors, in industrial or harsh environments, or in plenum spaces
- Includes: (1) top pan, (1) bottom pan, (4) mounting channels, (2) base angles, (2) top angles
- Assembly hardware; (100) #12-24 equipment mounting screws
- Equipment Support: Front and rear pairs of 3'' deep C-shaped equipment mounting channels, Fixed in place, 29'' apart front-to-rear, 19'' wide, EIA-310- D compliant hole pattern
- 1-3/4'' high rack-mount units (RMU); RMU spaces are marked and numbered on the channels
- Universal hole pattern, 5/8''-5/8''-1/2'' vertical hole spacing
- Threaded #12-24 equipment mounting holes, Includes 100 each #12-24 equipment mounting screws
- Load capacity: 2000 lb of equipment
- Material:; Aluminum extrusion, Aluminum sheet
- Construction: Bolted assembly, Ships unassembled
- Color: BLACK

- Quantity: See Drawing for quantity and installation details.
- Part#: Chatsworth Products Inc.
  Floor Mount Cabinet CPI# M1050-741
  Grounding Kit 10610-019
  Power Strip with Surge Suppression Leviton 5500-192

6. Outdoor Wireless Access Point Enclosure

- Non-glass-filled polyester material, UV resistance; Overlapping tongue-and-groove raised cover and gasket provide secure Type 4X seal
- Removable snap-hinge cover allows for easy access to cover and body for modifications
- Molded layout grid on inside of body and solid covers assists with component mounting
- Molded-in embosses for rear panel mounting
- Internal rail system and adjustable panel blocks allow
- UL 508A Listed, NEMA/EEMAC Type 4
- Material: Non-glass-filled polyester
- Color: Light-Gray
- Quantity: See Drawing for quantity and installation details.
- Part#: Pentair
- Polypro Wifi, PN# D16148WF

E. Cable Support System

1. Ladder Rack Cable Runway

- Stringers shall be fabricated from 16ga .375" x 1.5" Cold Rolled Steel tubing.
- Rungs shall be fabricated from 16ga .5" x 1.0" Cold Rolled Steel tubing
- Rungs shall be spaced at 9.0" center to center
- A straight length of ladder shall be capable of supporting 45 pounds per foot when a 10' length is tested according to NEMA VE-1.
- Ladder Rack shall have a powder coat finished.
- Ladder Rack shall be available in standard 6ft. and 10ft. lengths.
- Ladder rack shall be a part of a total system that includes: manufacture bends, wall supports, joining hardware, etc.
- Ladder Rack shall be grounding per the TIA/EIA 607-A.
- Color: Ladder Rack will be BLACK
- Quantity: See Drawing for quantity and installation details.
- Part#: Equal to Chatsworth Products Cable Raceway, PN# 11252-71X

2. Backbone Slack Loops

- Storage rings may be used to store coiled slack loops on backboard.
- Part #:
  Fiber storage rings, Indoor fiber: 48900-IFR Fiber storage rings, Outdoor fiber: 48900-OFR

PART 3 – EXECUTION

3.1 INSTALLATION

A. Work Area Outlets Installation

- No more than 12" of cable shall be stored in an outlet box, modular furniture raceway, or insulated walls.
- Bend radius of the cable in the termination area shall not be less than 4 times the outside diameter of the cable.
- The cable jacket shall be maintained to within 12.7mm (½ inch) of the termination point.
- All UTP cables shall have no more than 6.4mm (1/4 inch) of pair *untwisted* at the termination point.
- Data jacks, unless otherwise noted in drawings, shall be located in the top position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the left-most position(s).
- Voice jacks, unless otherwise noted in drawings, shall occupy the next position(s) below the data on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the position left of the data jack.
- Video jacks, unless otherwise noted in drawings, shall occupy the bottom position(s) on the faceplate. Video jacks in horizontally oriented faceplates shall occupy the position left of the data/voice jack.
- All faceplates installed shall be level.
- All outlets will be labeled according to the approved labeling scheme.
- Each faceplate shall be machine labeled. The labeling shall be placed on the faceplate so that the individual jack can be clearly identified by its associated label.
- Cables shall be identified by a self-adhesive label in accordance with the Identification and Labeling section of this specification and ANSI/TIA/EIA- 606. The cable label shall be applied to the cable no further than 6" behind termination module, behind the faceplate on a section of cable that can be accessed by removing the cover plate.

B. Horizontal Distribution Cable Installation

- Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- Nylon or plastic locking cable ties, e.g. "Zip-Ties", shall not be used on this project.
- Contractor will provide a three foot "service loop" for all station cables. The service loop will be coiled and secured using Velcro in the accessible ceiling at the conduit stub to the work area outlet box.
- Tie Wraps will not be allowed for supporting, bundling and/or dressing of any station cables on this project.
- Contractor will provide a three foot "service loop" for all station cables. The service loop will be coiled and secured using Velcro in the accessible ceiling at the conduit stub to the work area outlet box.
- A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in all "common" conduit runs. "Common" Conduit Runs are those that house more than one cable or set of cables that do not specifically feed a Work Station Outlet. Examples of "Common" Conduit Runs are: floor/ceiling penetrations, stub-throughs, distribution conduits, all conduits between J- boxes, etc.
- Cable raceways shall not be filled greater than the TIA/EIA-569-A maximum fill for the particular raceway type or 40%.
- Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
- The cable's minimum bend radius and maximum pulling tension shall not be exceeded.
- Pulling tension on 4-pair UTP cables shall not exceed 25-lb for a four-pair UTP cable.
- The Cable Support System shall be installed in such a way that will allow for future cables to be added and to provide sufficient protection of all cable.
- For all installs where station cables are not installed in a continuous conduit run the following guidelines will apply. The Contractor will be responsible to reinstall all cables and pathways that do not meet with the following at no additional cost to the Owner:
  - J-hooks shall be installed to support all station cables every 14" – 28" inches.
  - All pathways shall be run at right angles. No diagonal pathways will be allowed unless otherwise noted on the drawings.
  - Horizontal cables shall be bundled in groups of no more than 25 cables per Caddy's CAT21 J-hook, no more than 40 cables per Caddy's CAT32 J-hook, and no more than 64 cables per Caddy's CAT64 J-hook.

- A separate J-hook is used for each group of cable. Specifically, CAT6 cable, fiber cable, and fire alarm are to have their own J-hook.
- At no point shall cable(s) rest on acoustic ceiling grids, acoustic panels, or lighting fixtures.
- All cables will be installed so that there is a minimum of 3" of clearance above all ceiling grid and tiles.
- All cables will be installed so that there is a minimum of 12" of clearance above all florescent lighting.
- All cables will be installed so that there is a minimum of 6" of clearance from all fire alarm and electrical system conduits.
- Cables shall not be attached to the ceiling grid or lighting fixture wires. The contractor will provide their own carriers wires to support their horizontal cabling.
- All cables shall be installed above fire-sprinkler systems and plumbing system fixtures and devises. Cables shall not be attached to or supported by these fixtures and/or their ancillary equipment or hardware.
- The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- Contractor is responsible for sealing around all cables that penetrate fire rated barriers.

- Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

C. Horizontal Cross-Connect Installation

- Cables shall be cleaned, dressed, and terminated in accordance with the recommendations made in the TIA/EIA-568-A standard, manufacturer's recommendations and best industry practices. Contractor to verify standard network equipment can be installed without any interference from the cables. Equipment typically is installed directly above and/or below the panel.
- The cable jacket shall be maintained to within 12.7mm (½ inch) of the termination point.
- All UTP cables shall have no more than 6.4mm 1/4 inch) of pair untwist at the termination point.
- Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- All cables shall be neatly bundled in groups of 24 and dressed continuously from the entrance point of the Telecommunications Room to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame. Contractor will use

Velcro strip to bundle cables together. The use of Tie –Wraps is not permitted.

- Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

D. Backbone Cable Installation

- Backbone cables shall be installed separately from horizontal distribution cables.
- Each individual cable is to be labeled. See details sheets for labeling examples. Cable type and from/to are required. Each cable to be labeled at any accessible point, including, but not limited to, pull boxes, Christy boxes, junction boxes, and any pass through location.
- Where possible the backbone and horizontal cables shall be installed in separate conduits.
- Where possible backbone cables of the same type shall be combined in conduit runs to maximize conduit fill ratios.
- Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
- Pulling tension on Backbone cables shall not exceed the manufacture's limitations.
- The minimum bend radius for all Backbone cables is 16 times the cable diameter or the manufactures specification, whichever is greater.
- Cable slack shall be provided in every pull box, junction box, cabinet, entry facility, telecom room and termination enclosure.
  * 25 feet of slack per cable shall be mounted on a service ring inside the enclosure.
  * Entry & telecom rooms & cabinets: Minimum 25' feet coiled in re-closeable storage ring.
  * If 25' is not possible, contact the owner and discuss an agreeable amount of slack, followed up with an confirming RFI.
  * Minimum of 25' of slack in each vault and a minimum of 15' of slack in any other type of box (pull box, Christy box, pass through space, etc).
- All OSP cables may not penetrate more than 50ft into the buildings before be terminated or splices to cable with a fire resistant jacket, unless the jacket is indoor/outdoor rated.
- A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
- All backbone cables shall be securely fastened to the sidewall of the TR on each floor.
- Backbone cables spanning more than three floors shall be securely

attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
- Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
- Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

E. Backbone Cross-Connect Installation

- Cables shall be cleaned, dressed, and terminated in accordance with the recommendations made in the TIA/EIA-568-C document, manufacturer's recommendations and best industry practices.
- Bend radius of the cable in the termination area shall not exceed 16 times the outside diameter of the cable.
- All cables shall be neatly bundled and dressed continuously from the entrance point of the Telecommunications Room to their respective panels or blocks.
- Contractor will provide a minimum of a 3 foot "service loop" for each backbone cable before terminating to allow future rearrangement. Cables will be coiled and secured above the ceiling where possible or to the Telco Backboard where entrance point is from the floor.
- Wall mounted termination block fields shall be installed with the lowest edge of the mounting frame no less than 18" from the finished floor.
- Contractor shall provide a machine label 1ft. to 2ft. from the entrance point of the TR and 6in. to 12in. from the termination point on each backbone cable. Cable shall be easily identified and fully legible without removing the bundle support ties.

F. Cabinets, Racks, Enclosures and Ladder Rack Installation

- Wall Mount Racks/Cabinets shall be securely attached to the Telco Backboard using minimum 5/16" hardware or as required by local codes. Mounting rails shall be adjusted to the proper depth to allow for the closing of doors when populated with network electronics. Coordinate with Owner for final depth required.
- Floor Mount Racks/Cabinets shall be securely attached to the concrete floor using minimum 3/8" drop-in anchor hardware or as required by local codes.
- All Floor Mount Racks/Cabinets will be either; secured on one side to the wall or attached to the closest wall with ladder rack.
- All Racks/Cabinets shall be braced to meet Zone 4 seismic requirements.
- Contractor will maintain a minimum of 36 inches of clearance from the front of the all rack/cabinets and all other obstructions.

- Floor Mount Racks/Cabinets shall be installed to allow for a minimum of 36" from rear and all other obstructions.
- All racks shall be grounded to the telecommunications ground bus bar.
- Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.
- The plywood bottom edge shall be mounted vertically no less than 12" above the finished floor.
- Contractor will provide all cutouts for the Electrical Contractors expansion rings and electric receptacles as shown on the drawings.
- Ladder Rack must be securely attached to walls, backboards, and racks/cabinets to comply with all Zone 4 seismic requirements.
- Ladder rack shall be installed so that there is a minimum of 8" of unobstructed clearance above rack.
- Ladder Rack shall be installed so that there is a minimum of 12" of clearance from all: florescent lighting, electrical conduits/circuits, and fire alarm conduits/devices.

3.2 IDENTIFICATION AND LABELING

A. The labeling scheme for CAT6 cable is as follows for classrooms (verify with Owner prior to printing the labels):

When entering the room (if the room has multiple doors, the door designated as the primary entry door), label numbering shall start a one (1) and then increment as data drops are added going around the room, then any drops in the ceiling, and then any drops in the floor. For each room, numbering starts over at one (1). Each jack color starts at one (1) and increments for each additional jack of the same color. Label designations are based on jack color:

Blue = D# White = V# Yellow = W# Gray = A# Purple = C#

Patch Panel Label Format: RM# -

The first part of the label shall be the room number the data drop is located in, RM is part of the label, followed by the room number or room designation. The last part of the label shall be the type, as stated above based on jack color, then followed by the drop number. For example, RM3-D10 is room 3, data drop 10. RM3-V2 would be room 3, voice data drop 2.

The label format in the room: RM# - -

The first part of the label shall be RM, followed by the room number/

designation the cabinet/rack is located in.

The second part of the label shall be the patch panel the cable is terminated on. The top most panel is A and continues down with B, C, etc... If multiple panels span more than one rack/cabinet, when standing in front of the rack/cabinets, the top left panel shall be A.

The last part of the label uses the label based on jack color, as stated above, and the drop number. Example, RM3-A-D10: Indicates the other end of the cable is in the cabinet/rack in room 3, terminated on panel A, and the last portion, ie D10 in this example, was the tenth data drop in this room. The last portion, D10 in this example, would match the patch panel label, RM3-D10.

Label scheme for non-classroom buildings follows the above scheme, but the label number starts at 1 (one) for each type (D, V, W, A, C) and increments throughout the building and does not reset for each room/office. Start at one and do not repeat the number anywhere in the building (for each type).

B. The approved system will comply with the TIA/EIA -606-A Class 2 designations and include at a minimum, identifiers for all major components of the system: telecommunication rooms, grounding bus bars, racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure.

C. All label printing will be machine generated or hand-held printers using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

D. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

E. All fiber cable labels are to include the type, count, from and to on each label. Any point the fiber is accessible shall be labeled. At a minimum, that would include the starting point, any Christy boxes, cabinets/racks, any rooms the cable passes through, and the ending point. Service loops provided and labeled at each location, a minimum of 25' in each vault and 15' minimum in a Christy box/any other box or pass through space.

F. Labels are to be verified by Owner prior to printing. Labels are to include

building/room designations used by the site. Do NOT use building/room designations from the plans unless approved by Owner in writing.

3.3 TESTING AND ACCEPTANCE

A. General

1. The Owner reserves the right to be present during any & all types of tests being performed.
2. Contractor will notify the Owner/Owner's Representative 24 hours before commencement of testing.
3. Upon receipt of the test documentation, the Customer reserves the right to have the contractor perform a 10% witnessed "spot testing" of the cabling system to validate test results provided in the test document, at no additional cost. If a significant amount of cables are marginal and/or fail during the "spot test" Contractor will retest the entire cable plant at no additional cost.
4. Contractors shall provide proof of test equipment calibration prior to testing.
5. Test equipment shall have been factory calibrated within six months of project testing dates.
6. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of TIA/EIA-568-C, TSB-67 and TSB-95. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
7. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Manufacturer's Warranty guidelines and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.

B. Copper Cable Testing

1. Twisted Pair Cable

- All twisted-pair copper cable links (including backbone cables) shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below.
- Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened

cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.

- Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-A Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.

2. Category 6 Performance

- Follow the Standards requirements established in:
  - ANSI/TIA/EIA-568-C.0 Wire Map
  - Length Attenuation
  - NEXT (Near end crosstalk)
  - ANSI/TIA/EIA-568-C.2 Return Loss
  - ELFEXT Loss Propagation Delay Delay skew
  - PSNEXT (Power sum near-end crosstalk loss)
  - PSELFEXT (Power sum equal level far-end crosstalk loss)
- A Level III or better test unit is required to verify category 6 performances and must be updated to include the requirements of TSB-95 and Amendment 5. Testers will be equal to Fluke Network's DTX CableAnalyzer™ Series.
- All testers shall have been recalibrated within 6 months of use on this project. Contractor will be asked to provide proof of recalibration.
- Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard, and the result shown as pass/fail. The approved Level Three tester shall provide a printed document for each test that is also available in a downloadable file using an application from the test equipment manufacturer. The printed test results shall include a print out of all tests performed, and the individual test results for each cable.

C. Fiber Optic Cable Testing

1. Backbone Fiber

- Each fiber strand shall be tested for attenuation with an Optical Power Meter and light source and with an Optical Time Domain Reflectometer (OTDR) for actual length and splice/connector loss. Cable length shall be verified using sheath markings. The guidelines and procedures established for Tier 1 testing in TIA/TSB-140 shall apply.
- All fiber optic cables shall be tested from the site's MDF to each fiber terminals located in the IDF. The results of OTDR testing to define the length of each riser cable shall be documented. The Contractor shall conduct a power meter (loss) test of each fiber optic station and riser cable at both wavelengths, 850/1300nm for MM and 1310/1550nm for SM, A to B, B to A, and OSPL (OSPL is defined as La + Lb). No individual station or riser fiber link segment (including connectors) shall measure more than 2.0 dB loss.
- Tests shall be conducted using ANSI/EIA/TIA/EIA-526-14A, Method B. Test results evaluation for the panel to panel (backbone) shall be based on the values set forth in ANSI/TIA/EIA-568-C.2.The Contractor shall provide an electronic printout for each strand tested with the Power Meter and the OTDR.
- Where concatenated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, each link shall be concatenated and tested. The test method shall be the same used for the test described above. The evaluation criteria shall be established between the Owner and the Contractor prior to the start of the test.
- All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps necessary to repair or replace any optic not meeting the standard.
- Fiber optic riser and station cable test results shall be provided in electronic format to the Owner.

3.4 SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

A. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner's Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.

B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner's Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.

C. The Owner's Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

D. Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, a bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

E. Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

G. The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. These documents will be modified accordingly

by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.

H. Contractor will provide one laminated 11"x17" drawing at each IDF that includes the building layout for that IDF, along with the outlet locations and all of the approved labeling. The as-built/current layout is to be provided.

I. Test results are to be submitted to the manufacturer and a copy of the warranty certification is to be provided to the owner.

END OF SECTION

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SECTION 28 00 00

ELECTRONIC SAFETY AND SECURITY

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Section 01 33 00 – Submittal Procedures

B. Section 26 00 00 – Electrical

C. Section 27 20 00 – Data Communications

1.2 SCOPE

A. This section provides the minimum requirements for Electronic Safety and Security Systems. Additional requirements are to be found in subsections of this specification.

1.3 SUBMITTALS

A. General Requirements
   1. All submittals shall be made in accordance with section 01 33 00.

B. Licensure
   1. Submit proof of possession of a valid C-7 California State Contractor's License in good standing.

C. System Submittals and Shop Drawings
   1. Submit a complete list of equipment and materials proposed for the system with catalog cuts, technical data, manufacturer's Specifications and detail drawings.
   2. Submit a complete set of detailed, scaled Shop Drawings of all racks, cabinets, and equipment, with all designations, dimensions, color, controls, wiring, and schematic diagrams of all circuits. Show interfaces to all equipment furnished, including equipment furnished by other contractors, identifying numbers of wires, termination requirements, voltages and other pertinent details. Include front elevations, cabinet dimensions, types of mounting, door barriers, catalog number of locks and finishes of terminal cabinets.

D. Spare Parts Data
   1. After shop drawings are approved, and not later than thirty (30) calendar days prior to the date of beneficial occupancy, a list of spare parts data for

each item of specified materials and equipment shall be submitted. The data shall include a complete list of parts and supplies with current unit prices and source of supply.

E. Operating and Maintenance Documents
   1. The contractor shall furnish to the architect (3) copies of operating and maintenance instructions.
   2. Documentation shall outline the step-by-step procedures required for system start-up, operation, and shutdown.
   3. Documentation shall list routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides.
   4. Documentation shall be submitted at least thirty (30) calendar days prior to acceptance test. The instructions shall include the manufacturer's name, system model number, service manual, parts list, and a description of all equipment and their basic operating features.

F. Warranty
   1. A copy of the manufacturer's warranty for all equipment and materials shall be provided.

G. Close-Out Documents
   1. Upon completion of the installation, the contractor shall provide four copies (one hard copy and three electronic copies) of Project Close-Out Documents to the Owner. Documentation shall include the items detailed below.
   2. As-Built Drawings
      a. The contractor shall provide a complete set of as-built drawings for the entire system upon installation completion.
      b. These drawings shall include, but not be limited to, the exact locations of all equipment, connections between all equipment, and wiring for all equipment as the system is installed.
      c. printout of configuration
   3. All System source codes and passwords (Crestron Programs) must be handed over to, and become property of the Owner upon completion of this project.

H. All submittals called for shall be instruments of the Contractor, even though they may have been prepared by a subcontractor, supplier, dealer, manufacturer, or by any other person, firm or organization. Prior to submission, the Contractor shall undertake its own review and stamp with its acceptance prior to submittal.

1.4 SCOPE OF WORK

A. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction is required to accomplish work indicated or specified in this or other sections, it

shall be the responsibility of the Contractor to provide all materials and equipment which is usually furnished with such systems in order to complete the installation, whether or not specifically mentioned herein.

1.5 APPROVAL

A. Installation of the system shall not commence until all approvals are granted by the Division of the State Architect (DSA).

B. Installation of the system shall not commence until all shop drawings and submittals are approved by the School Owner, Architect of Record, and Engineer of Record.

1.6 QUALITY ASSURANCE

A. Contractor Qualifications
   1. Must hold a valid State of California C-7 license in good standing;
   2. Must have completed at least three (3) projects of equal scope within the last three (3) years;
   3. Must maintain a service office within 50 miles of the project;
   4. Must be bonded to assure performance and satisfactory service during the guarantee period;
   5. Contractor must be registered with BICSI and have at least one RCDD on staff;
   6. Must have personnel fluent in the use of Computer Aided Design and possess and operate CAD software using .DWG or .DXF format.

B. All equipment and wiring shall be furnished and installed by the authorized factory distributor of the equipment. The manufacturer's representative of each system shall provide a letter from the manufacturer of all major equipment with submittals stating that he is the representative and that the manufacturer will have a service representative assigned to this area for the life of the equipment.

C. The Contractor shall furnish a letter from the manufacturer of the equipment specified, which certifies that the equipment has been installed according to factory recommended practices and that the system is operating satisfactorily.

D. The Contractor shall provide not less than sixteen (16) hours of instruction to personnel in the operation, programming, and maintenance of each system. This instruction time shall be divided up as directed by the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials from damage during handling and installation.

1.8 COORDINATION

A. Coordinate the Work of this section with the Work of other sections, including sprinkler systems, fire alarm systems, HVAC systems, security systems, etc., as applicable.

1.9 WARRANTY

A. The entire system shall be guaranteed free of mechanical or electrical defects for a period of one year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the Owner. Guarantee period shall begin from the date of final acceptance by the Owner.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. References to manufacturer's model numbers and other information is intended to establish minimum standards of performance, function, and quality. Equivalent equipment from the specified manufacturer's may be substituted for the specified equipment, as long as the minimum standards are met.

B. Certain equipment will be specified "No Substitution". The County of Fresno will require these items in accordance with California Public Contract Code Division 2, Part 1, Chapter 3, Article 5, Section 3400(b)(2), in order to match centrally located facilities software and hardware, and to reduce the number of different types of parts required for repair and expansion.

PART 3 - EXECUTION

3.1 GENERAL

A. All Work described in this specifying documents and on the Project drawings shall be performed in accordance with the acknowledged Professional and industry standards and practices. All installed equipment shall meet or exceed the specified manufactures regulations.

B. Materials shall be installed in strict compliance with all local, state, county, province, Owner, federal and other applicable building, safety, and fire standards, laws, codes, regulations, and guidelines including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ).

C. Examine areas and surfaces to receive each system.
   1. Notify Architect of conditions that would adversely affect installation or subsequent use.
   2. Do not begin installation until unacceptable conditions are corrected.

D. The Contractor shall maintain a competent Supervisor and Manufacturer Certified Technicians assigned to this installation for the duration of the Project.

E. Furnish and install all materials, devices, components and equipment required for a complete and operational system.

F. It is the Contractor's responsibility and obligation to coordinate with all necessary trades to ensure that the integrity of and compliance with Manufacturer and industry standards are met during the duration of the installation.

3.2 INSTALLATION

A. Furnish control panels, components, devices, cabinetry, wire, connectors, materials, parts, equipment, labor, etc. necessary for the complete installation of the systems in full accordance with the recommendations of the equipment manufacturers and the requirements of the drawings and specifications.

B. Coordinate the required space in Data equipment frames with this and other network based Communications systems that may share rack space. Provide racks with sufficient space to accommodate patch panels, switches, power supplies, etc. for all network interfaced systems.

C. Installations shall follow standard wiring and installation practice, and shall meet or exceed industry standards of such work.

D. Wire not installed in equipment racks, not portable, in unrated ceiling space, or not installed in conduit shall be fire rated and meet all applicable codes.

E. Wire and cable for all other devices shall be supplied in accordance with the recommendations of the device manufacturer, CEC, and NEC.

F. Equipment shall be held firmly in place with proper types of mounting hardware. All equipment affixed to the building structure must be self-supporting with a safety factor of at least three. All equipment shall be installed so as to provide

reasonable safety to the operator. Supply adequate ventilation for all enclosed equipment items which produce heat.

G. Furnish each system to facilitate expansion and servicing using modular, solid-state components. All equipment shall be designed and rated for continuous operation and shall be UL listed, or manufactured to UL standards.

H. Shields of audio cables shall be grounded at one end only, at the input side of all equipment items in the system.

I. Observe proper circuit polarity and loudspeaker wiring polarity. No cables shall be wired with a polarity reversal between connectors with respect to either end. Special care shall be taken when wiring microphone cables, to insure that constant polarity is maintained.

J. Route cables and wiring within equipment racks and cabinetry according to function, separating wires of different signal levels (data, fire alarm SLC, fire alarm NAC, speaker, intrusion, etc.) by as much physical distances possible. Neatly arrange and bundle all cables loosely with Velcro cable ties. Cables and wires shall be continuous lengths without splices.

K. All cables in conduits shall be insulated from each other and from the conduit the entire length and shall not be spliced. All cables and wires are to be continuous lengths without splices.

L. Mechanical connections shall be made using approved connectors of the correct size and type for the connection. Wire nuts will not be accepted.

N. Label all wires in racks and console as to destination and purpose. Clearly and permanently label all jacks, controls, and connections. All labeling shall be completed prior to final system inspection.

3.3 PROGRAMMING

A. Contractor shall provide all necessary programming to provide complete operating systems.

B. Contractor shall include in their bid one (1) four (4) hour planning meeting with the Owner and their Representatives for each system to outline all specific programming issues for each system, as well as, but limited to:
   1. Contractor will be informed of any specific requirements for use of the system.
   2. Contractor will provide overview of system capabilities.
   3. Contractor will address all concerns of the Owner and their Representatives.

C. Contractor shall include in their bid one (1) four (4) hour planning meeting with the Owner and their Representatives for each system, scheduled at least six (6) months after job final, to review the system performance and modify programming as needed. Programming modifications shall be provided at no cost to the Owner.

3.4 TESTING

A. Completed systems shall be physically inspected by the Owner's representative to assure that all equipment is installed in a neat and professional manner and in accordance with these Specifications.

B. Final systems testing and commissioning shall be performed after all installation and initial testing has been completed by the Installer, but prior to any use of the systems.

C. The Contractor, prior to requesting systems testing and demonstration to the Owner's representative, shall ensure that all systems are in first-class working condition and free of shorts, ground faults/loops, parasitic oscillations excessive hum and noise, RF interference, or instability of any form.

D. The Contractor shall be responsible for properly performing all setup and alignment of the systems, and all assembly and setup of portable equipment.

3.5 COMMISSIONING

A. All testing documentation shall be supplied with the as-built documentation.

B. The Contractor will include in their bid price six (6) hours for onsite commissioning and will provide the installation technician who was responsible for this project to be present at the system commissioning to tune, fix, repair, and/or replace all system components that do not operate within the tolerance as set forth in the specifications, project documents, and industry standards.

C. The final acceptance of the system by the Owner will be based upon the report of its representative following inspection, testing, and commissioning. A list of items in need of completion or correction shall be generated the Owner, which must be corrected by the Installer before final acceptance will be granted.

END OF SECTION

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SECTION 28 31 00

FIRE DETECTION AND ALARM

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Section 21 00 00 – Fire Suppression.

B. Section 26 05 00 – Common Work Results for Electrical

C. Section 27 20 00 – Data Communications

D. Section 27 30 00 – Voice Communications

1.2 REFERENCES

A. Electrical Industries Association (EIA):
   1. EIA-232-D – Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange
   2. TIA-485-A – Electrical Characteristics of Generators and Receivers for Use in Balanced Multipoint Systems

B. California Code of Regulations
   1. Title 24, Part 3 – California Electrical Code (CEC)

C. National Fire Protection Association (NFPA):
   1. NFPA 12 – Standard on Carbon Dioxide Extinguishing Systems.
   2. NFPA 13 – Installation of Sprinkler Systems.
   3. NFPA 15 – Standard for Water Spray Fixed Systems for Fire Protection.
   4. NFPA 16 – Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems.
   5. NFPA 16A – Standard for the Installation of Closed Head Foam-Water Sprinkler Systems.
   6. NFPA 70 – National Electrical Code (NEC)
   7. NFPA 72 – National Fire Alarm Code.
   8. NFPA 90A – Standard for the Installation of Air Conditioning and Ventilating Systems.
   9. NFPA 101 – Life Safety Code.
   10. NFPA 750 – Standard on Water Mist Fire Protection Systems.
   11. NFPA 5000 – Building Construction and Safety Code.

D. Underwriters Laboratories (UL):
   1. UL 268 – Standard for Smoke Detectors for Fire Alarm Signaling Systems.

2. UL 864 – Standard for Control Units and Accessories for Fire Alarm Systems.
3. UL 1971 – Standard for Signaling Devices for the Hearing Impaired.

1.3 SCOPE OF WORK

A. Furnish all labor, equipment, and materials for, and comply with the performance requirements of the Fire Alarm System indicated in the drawings and specified herein.

B. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction is required to accomplish work indicated or specified in this or other sections, it shall be the responsibility of the Contractor to provide all materials and equipment which is usually furnished with such systems in order to complete the installation, whether or not specifically mentioned herein.

1.4 SYSTEM DESCRIPTION

A. A new intelligent reporting, Style 7 networked, fully peer-to-peer, microprocessor-controlled fire detection and notification system shall be installed in accordance with the specifications and as indicated on the Drawings.

B. Basic Performance:
   1. Network Communications Circuit Serving Network Nodes: Connected using approved fiber optic cable between nodes in Class A configuration (NFPA Style 7).
   2. Signaling Line Circuits (SLC) Serving Addressable Devices: Wired Class B.
   3. Initiation Device Circuits (IDC) Serving Non-addressable Devices Connected to Addressable Monitor Modules: Wired Class B.
   4. Notification Appliance Circuits (NAC) Serving Strobes and Horns: Wired Class B.
   5. Alarm Signals Arriving at Control Panel: Not lost following primary power failure until alarm signal is processed and recorded.
   6. Network Node Communications:
      a. Communicated between panels on fiber optic cables.
      b. To enhance system survivability, ability to operate on loss of Command Center, short or open of entire riser at Command Center shall be demonstrated at time of system acceptance testing.
      c. Systems that are not capable of providing true Style 7 riser performance shall not be acceptable.
   7. Signaling Line Circuits (SLC):
      a. Reside in remote panels with associated audio zones.
      b. SLC modules shall operate in peer-to-peer fashion with all other panels in system.
      c. On loss of Command Center, each remaining panel shall continue to communicate with remainder of system, including all SLC and control

functions Systems that provide a "Degraded" mode of operation upon loss of Command Center or short in riser shall not be acceptable.

d. Limit the number of devices to 80% of the maximum allowed of each type on SLC circuits.

8. Notification Appliance Circuits (NAC), and Control Equipment:
   a. Arranged such that loss of any 1 NAC circuit will not cause loss of any other NAC circuit in system.
   b. Electrically supervised for open and short circuit conditions.
   c. If short circuit exists on NAC circuit, it shall not be possible to activate that circuit.
   d. Voltage drop is not to exceed 10% at the furthest point on any NAC circuit.
9. Standby Power:
   a. Provide a minimum of 20% spare battery capacity above calculated requirements.

C. Sequence of Operations:
   1. General Alarm: Upon alarm activation of any area smoke detector, duct smoke detector, heat detector, manual pull station, or sprinkler water flow switch, the following functions shall automatically occur:
      a. The internal audible device shall sound at the control panel or command center.
      b. The LCD Display shall indicate all applicable information associated with the alarm condition including zone, device type, device location and time/date.
      c. All system activity/events shall be documented on the system printer.
      d. Any remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.
      e. The following notification signals and actions shall occur simultaneously:
         i. A signal shall be sounded on fire floors (zones). The signal shall be a Temporal 3 tone.
         ii. Activate visual strobes on the fire floors (zones). The visual strobe shall stop operating when the "Alarm Silence" is pressed.
         iii. Transmit signal to the building automation system (if applicable) and/or shutdown all HVAC units serving the floor of alarm.
         iv. Transmit signal to the central station with point identification.
         v. Activate automatic smoke control sequences (if applicable).
         vi. All stairwell/exit doors shall unlock throughout the building.
         vii. All self-closing fire/smoke doors held open shall be released.
         viii. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

2. Elevator Lobby / Equipment Room Detectors: Upon alarm activation of any elevator lobby smoke detector or equipment room detector the following functions shall automatically occur:
   a. Perform general alarm sequence above.
   b. Elevator Lobby smoke detectors shall recall the elevators to primary floor
   c. Elevator Lobby smoke detectors located on the primary recall floor shall recall the elevator the alternate floor.
   d. Equipment room smoke detectors shall recall the elevator to the primary floor.
   e. Activation of the Equipment room heat detector shall initiate the shunt trip in the associated elevator equipment room.
3. Supervisory Operation: Upon supervisory activation of any sprinkler valve supervisory switch, fire pump off-normal, clean agent fire suppression system trouble, the following functions shall automatically occur:
   a. The internal audible device shall sound at the control panel or command center.
   b. The LCD display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.
   c. All system activity/events shall be documented on the system printer.
   d. Any remote or local annunciator LCD/LED's associated with the supervisory zone shall be illuminated.
   e. Transmit signal to the central station with point identification.
4. Trouble Operation: Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
   a. The internal audible device shall sound at the control panel or command center.
   b. The LCD keypad display shall indicate all applicable information associated with the trouble condition including; zone, device type, device location and time/date.
   c. All system activity/events shall be documented on the system printer.
   d. Any remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.
   e. Transmit signal to the central station with point identification.
5. Monitor Operation: Upon activation of any device connected to a monitor circuit (fire pump/emergency generator status), the following functions shall automatically occur:
   a. The LCD display shall indicate all applicable information associated with the status condition including; zone, device type, device location and time/date.
   b. All system activity/events shall be documented on the system printer.
   c. Any remote or local annunciator LCD/LED's associated with the status zone shall be illuminated.

D. Fire Alarm System Functionality:
   1. Provide complete, electrically supervised distributed, networked analog/addressable fire alarm and control system, with analog initiating devices.
   2. Fire Alarm System:
      a. Incorporate E3 Series multiprocessor-based control panels, with Intelligent Loop Interface (ILI-MB-E3), and RPT-E3 repeater modules communicating over peer-to-peer token ring network with capacity of up to 64 nodes.
   3. Each ILI-MB-E3 Node: Incorporate 2 Signaling Line Circuits (SLC), with capacity to support up to 159 analog addressable detectors and 159 addressable modules per SLC.
   4. All data transmits over single pair of wires or fiber optic cable.
   5. Each Network Node: Incorporate Boolean control-by-event programming, including as a minimum AND, OR, NOT, and Timer functions.
   6. Control Panels: Capability to accept firmware upgrades via connection with laptop computer, without requirement of replacing microchips.
   7. Network:
      a. Based on peer-to-peer token ring technology operating at 625 K baud, using Style 7 configuration.
      b. Capability of using twisted-pair wiring, pair of fiber optic cable strands up to 200 microns, or both, to maximize flexibility in system configuration.
   8. Each Network Node:
      a. Capability of being programmed off-line using Windows-based software utilized by fire alarm system manufacturer. Capability of being downloaded by connecting laptop computer into any other node in system. Systems that require system software to be downloaded to each transponder at each transponder location shall not be acceptable.
      b. Capability of being grouped with any number of additional nodes to produce a "Region", allowing that group of nodes to act as 1, while retaining peer-to-peer functionality. Systems utilizing "Master/Slave" configurations shall not be acceptable.
      c. Capability of annunciating all events within its "Region" or annunciating all events from entire network, on front panel LCD without additional equipment.
   9. Each SLC Network Node: Capability of having integral DACT (digital alarm communicator transmitter) that can report events in either its region, or entire network to single central station monitoring account.
   10. Each Control Panel: Capability of storing its entire program, and allow installer to activate only devices that are installed during construction, without further downloading of system.
   12. Password Protection: Each system shall be provided with 4 levels of password protection with up to 16 passwords.

1.5 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures.

B. Include sufficient information, clearly presented, to determine compliance with the specifications and the Drawings. Insufficiently detailed submittals shall be rejected.

C. Equipment Submittals:
   1. Cover Page: Indicate the following:
      a. Project name and address.
      b. Engineered systems distributor's name and other contact information.
      c. Installing contractor's name and other contact information.
      d. Date of equipment submittals. Indicate on revised submittals the original submittal date and revised submittal date.
   2. Table of Contents: Lists each section of equipment submittal.
   3. Scope of Work Narrative: Detail indented scope of work.
   4. Sequence of Operations: Use matrix or written text format, detailing activation of each type of device and associated resulting activation of the following:
      a. Control panel.
      b. Annunciator panels.
      c. Notification appliances.
      d. Building fire safety functions, including elevator recall, elevator power shutdown, door lock release, door holder release, HVAC unit shutdown, smoke evacuation system activation, and stair pressurization fan activation.
   5. Bill of Material: Indicate for each component of system the following:
      a. Quantity.
      b. Model number.
      c. Description.
   6. SLC Circuit Schedule: Detail address and associated description of each addressable device. Clearly provide information that indicates number of both active and spare addresses.
   7. Battery Calculations: Show load of each of, and total of, components of system along with standby and alarm times that calculations are based on. Show calculated spare capacity and size of intended battery.

D. Shop Drawings:
   1. Cover Page: Indicate the following:
      a. Project name and address.
      b. Engineered systems distributor's name and other contact information.
      c. Installing contractor's name and other contact information.
      d. Date of equipment submittals. Indicate on revised submittals the original submittal date and revised submittal date.

2. Floor Plans:
   a. Provide separate floor plan for each floor.
   b. If a floor plan must be split using match lines to fit on the page, provide match lines and match line references that refer to sheet number that shows area on opposite side of match line.
   c. Prepare using CAD program capable of producing AutoCAD compliant DXF (Drawings Exchange Format) files.
   d. Prepare to scale no smaller than 1/8 inch = 1'-0", unless otherwise required by the Architect or Engineer.
   e. Show equipment and device locations.
   f. Show wiring information in point-to-point format.
   g. Show conduit routing, if required by the AHJ.
3. Title Block: Provide on each sheet and include, at a minimum, the following:
   a. Project name.
   b. Project address.
   c. Sheet name.
   d. Sheet number.
   e. Scale of drawing.
   f. Date of drawing.
   g. Revision dates, if applicable.
4. Control Panel: Provide sheet that details exterior and interior views of control panel and clearly shows associated wiring information.
5. Annunciator Panels: Provide sheet that details exterior and interior views of annunciator panels and clearly shows associated wiring information.

E. Certification: Submit with equipment submittals and shop drawings, letter of certification from major equipment manufacturer, indicating proposed engineered system distributor is an authorized representative of major equipment manufacturer.

F. Project Record Drawings:
   1. Submit complete project record drawings within 14 calendar days after acceptance test.
   2. Project record drawings shall be similar to shop drawings, but revised to reflect changes made during construction.

G. Operation and Maintenance Manuals:
   1. Submit complete operation and maintenance manuals within 14 calendar days after acceptance test.
   2. Operation and maintenance manuals shall be similar to equipment submittals, but revised to reflect changes made during construction.
   3. Include factory's standard installation and operating instructions.

1.6 APPROVAL

A. All Fire Alarm System components are required to be listed with the California State Fire Marshal (CSFM).

B. Installation of the Fire Alarm System shall not commence until all approvals are granted by the California State Fire Marshal (CSFM), Division of the State Architect (DSA), and any other Authorities Having Jurisdiction (AHJ).

C. Installation of the system shall not commence until all shop drawings and submittals are approved by the Owner, Architect of Record, and Engineer of Record.

1.7 QUALITY ASSURANCE

A. Codes and Standards:
   1. NFPA: System shall comply with all applicable NFPA codes and standards:
   2. ADA: System shall conform to American with Disabilities Act (ADA).

B. To ensure reliability and complete compatibility, all items of fire alarm system, including control panels, power supplies, initiating devices, and notification appliances, shall be listed by Underwriters Laboratories Inc. (UL) and shall bear the "UL" label.

C. Fire Alarm Control Panel Equipment: UL-listed under UL 864 Ninth Edition.

D. Equipment, Programming, and Installation Supervision:
   1. The contractor is required to hold a C-10 license and any other certifications required by the Authority Having Jurisdiction.
   2. The contractor is required to be an approved engineered systems distributor of Gamewell-FCI for equipment, programming, and installation supervision.
   3. Proof of factory training shall be delivered within 14 calendar days of award of the Contract.

E. Software Modifications:
   1. Provide services of Gamewell-FCI factory-trained and authorized technician to perform system software modifications, upgrades, or changes.
   2. Provide use of all hardware, software, programming tools, and documentation necessary to modify fire alarm system software on-site.
   3. Modification includes addition and deletion of devices, circuits, zones, and changes to system operation and custom label changes for devices or zones.
   4. System structure and software shall place no limit on type or extent of software modifications on-site.

5. Modification of software shall not require power-down of system or loss of system fire protection while modifications are being made.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials from damage during handling and installation.

1.9 COORDINATION

A. Coordinate the Work of this section with the Work of other sections, including sprinkler systems, elevators, HVAC systems, and security/door locking systems, as applicable.

1.10 WARRANTY

A. Warranty Period for System Equipment: 1 year from date of final acceptance.

B. Trouble Calls: The contractor shall guarantee on-site service for the Fire Alarm System within 24 hours of the receipt of a trouble call.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Gamewell-FCI, Honeywell Fire Systems
12 Clintonville Road, Northford, Connecticut 06472. Phone (203) 484-7161. Fax (203) 484-7118. Website: www.gamewell-fci.com
1. NO SUBSTITUTION.

B. System Sensor
3825 Ohio Avenue, St. Charles, Illinois 60174.
Phone (630) 377-6580. Fax (630) 377-6495. Website: www.systemsensor.com

2.2 DISTRIBUTED NETWORKED FIRE ALARM SYSTEM

A. Distributed Networked Fire Alarm System: Gamewell-FCI E3 Series Expandable Emergency Evacuation Fire Alarm System.

2.3 CONTROL PANEL HARDWARE

A. Intelligent Control Panel: Supply user interface, including LCD or touch-screen 1/4 VGA display Intelligent Loop Interface Modules (ILI-MB-E3), manual switching, Control Panel shall consist of the following units and components:
1. System Cabinet (B-, C-, or D-Size Cabinet) with associated inner door.
2. Power Supply Module (PM-9) with batteries.
3. 80-Character LCD Display (LCD-E3).
4. Intelligent Loop Main Board Interface (ILI-MB-E3).
5. Intelligent Loop Supplemental Interface (ILI-S-E3).
6. FocalPoint Gateway (FPT-GATE-E3).
7. Optional DACT (DACT-E3).
8. Optional Network Repeater (RPT-E3).
9. Optional 1/4 VGA touch-screen display (NGA).
10. Optional Auxiliary Switch Module (ASM-16).

B. System Cabinet:
1. Surface or semi-flush mounted with texture finish.
2. Consist of back box, inner door, and door.
3. Available in at least 3 sizes to best fit project configuration.
4. Houses 1 or more PM-9 Power Supply Modules, 1 or more ILI-MB-E3 or ILI-S-E3 assemblies, and other optional modules as specified.
5. Construction: Dead-front steel construction with inner door to conceal internal circuitry and wiring.
6. Wiring: Terminated on removable terminal blocks to allow field servicing of modules without disrupting system wiring.

C. Power Supply Module (PM-9): Use latest technologies to provide power to the Control Panel and incorporate the following features:
1. Power-saving switching technology using no step-down transformers.
2. 9-amp continuous-rated output to supply up to all power necessary under normal and emergency conditions.
3. Integral battery charger with capacity to charge up to 55 amp-hour batteries while under full load.

D. Batteries:

1. Sufficient capacity to provide power for entire system upon loss of normal AC power for a period of 24 hours with 15 minutes of alarm signaling at end of this 24-hour period, as required by NFPA 72, Local Systems.

E. LED Display Module (LCD-E3):
1. LCD Display: 80-character RS-485 based textual annunciator with capability of being mounted locally or remotely. Provides audible and visual annunciation of all alarms and trouble signals. Provide dedicated LEDs for:

a. AC Power On: Green.
b. Alarm: Red.
c. Supervisory: Yellow.
d. System Trouble: Yellow.
e. Power Fault: Yellow.
f. Ground Fault: Yellow.
g. System Silenced: Yellow.

2. 80-Character Alphanumeric Display: Provide status of all analog/addressable sensors, monitor and control modules. Display shall be liquid crystal type (LCD), clearly visible in dark and under all light conditions.
3. Panel shall contain 4 functional keys:
   a. Alarm Acknowledge.
   b. Trouble Acknowledge.
   c. Signal Silence.
   d. System Reset/Lamp Test.
4. Panel shall contain 3 configuration buttons:
   a. Menu/Back.
   b. Back Space/Edit.
   c. OK/Enter.
5. Panel shall have 12-key telephone-style keypad to permit selection of functions.

F. Intelligent Loop Interface (ILI-MB-E3): System shall be of multiprocessor design to allow maximum flexibility of capabilities and operation. Intelligent Loop Interface shall be capable of mounting in stand-alone enclosure as specified.
1. Field Programmable: System shall be capable of being programmed by Field Configuration Program (FCP), allowing programming to be downloaded via portable computer from any node on network.
2. RS-232C Serial Output: Supervised RS-232C serial port shall be provided to operate remote printers and/or video terminals, accept downloaded program from portable computer, or provide 80-column readout of all alarms, troubles, location descriptions, time, and date. Communication shall be standard ASCII code operating from 1,200 to 115,200 baud rate.
3. RS-485 Serial Output: Each ILI-MB-E3 shall incorporate RS-485 bus via ribbon harness for connection of modules inside same cabinet, and via 4-wire quick connector for connection of modules up to 3,000 feet from cabinet. Each ILI-MB-E3's RS-485 bus shall support up to 16 ASM-16 auxiliary switch modules, 6 LCD-E3 main annunciators, and 5 LCD-7100 annunciators.
4. Peer-to-Peer Panel Configuration: All Loop Interface Modules shall incorporate own programming, log functions, Central Processor Unit, and control-by-event (CBE) programming. If any loop driver becomes disabled, each remaining loop driver shall continue to communicate with remainder of network and maintain normal operation.
5. Control-by-Event (CBE) Program: ILI-MB-E3 shall be capable of programming using Boolean logic including AND, OR, NOT, and TIMING functions to provide complete programming flexibility.

6. Alarm Verification: Smoke detector alarm verification shall be standard option while allowing other devices such as manual stations and sprinkler flow to create immediate alarm. This feature shall be selectable for smoke sensors that are installed in environments prone to nuisance or unwanted alarms.
7. Alarm Signals: All alarm signals shall be automatically latched or "locked in" at control panel until operated device is returned to normal and control panel is manually reset. When used for sprinkler flow, "SIGNAL SILENCE" switch may be bypassed, if required by AHJ.
8. Electrically Supervised:
    a. Each SLC and NAC circuit shall be electrically supervised for opens, shorts, and ground faults. Occurrence of fault shall activate system trouble circuitry, but shall not interfere with proper operation of other circuits.
    b. Yellow "SYSTEM TROUBLE" LEDs shall light and system audible sounder shall steadily sound when trouble is detected in system. Failure of power, open or short circuits on SLC or NAC circuits, disarrangement in system wiring, failure of microprocessor or any identification module, or system ground faults shall activate this trouble circuit. Trouble signal shall be acknowledged by operating "TROUBLE ACKNOWLEDGE" switch. This shall silence sounder. If subsequent trouble conditions occur, trouble circuitry shall resound. During alarm, all trouble signals shall be suppressed with exception of lighting yellow "SYSTEM TROUBLE" LEDs.
9. Drift Compensation – Analog Smoke Sensors: System software shall automatically adjust each analog smoke sensor approximately once each week for changes in sensitivity due to effects of component aging or environment, including dust. Each sensor shall maintain its actual sensitivity under adverse conditions to respond to alarm conditions while ignoring factors which generally contribute to nuisance alarms. System trouble circuitry shall activate, display units that requires maintenance.
10. Analog Smoke Sensor Test: System software shall automatically test each analog smoke sensor a minimum of 3 times daily. Test shall be recognized functional test of each photocell (analog photoelectric sensors) and ionization chamber (analog ionization sensors) as required annually by NFPA 72. Failure of sensor shall activate system trouble circuitry, display "Test Failed" indication, and identify individual device that failed.
11. Off-Premises Connection:
    a. Fire Alarm System: Connect via Digital Alarm Communicator Transmitter (DACT) and telephone lines to central station or remote station. Panel shall contain disconnect switch to allow testing of system without notifying fire department.
12. Central Station Option: Fire alarm control panel shall provide Digital Alarm Communicator Transmitter (DACT) for signaling to central station. DACT shall contain "Dialer-Runaway" feature preventing unnecessary transmissions as result of intermittent faults in system and shall be Carrier

Access Code (CAC) compliant, accepting up to 20-digit central station telephone numbers. Fire department shall be consulted as to authorized central station companies serving municipality. Fire alarm system shall transmit both alarm and trouble signals, with alarm having priority over trouble signal. Contractor shall be responsible for all installation charges and Owner will be responsible for line lease charges.

13. Network Annunciator Option: Each ILI-MB-E3 and associated display shall provide option of being configured as network annunciator. Options for annunciation shall default as regional annunciator with capability of selecting global annunciation to provide system-wide protection and Acknowledge, Silence, and Reset capabilities.
14. Redundant History Log: Each ILI-MB-E3 shall contain full 4100 event history log supporting local and network functions. If a main processor or network node is lost the entire log shall be accessible at any other Loop Interface board. This shall be demonstrated by removing power from Command Center followed by extraction of history log from any loop driver location, including Command Center or Transponder.
15. LEDs Indicator and Outputs: Each ILI-MB-E3 Loop Interface shall incorporate as a minimum the following diagnostic LED indicators:
    a. Power: Green.
    b. Alarm: Red.
    c. Supervisory: Yellow.
    d. General Trouble: Yellow.
    e. Ground Fault: Yellow.
    f. Transmit: Green.
    g. Receive: Green.
16. Auxiliary Power Outputs: Each ILI-MB-E3 Loop Interface shall provide the following supply outputs:
    a. 24 VDC non-resettable, 1 amp. maximum, power limited.
    b. 24 VDC resettable, 1 amp. maximum, power limited.
17. Microprocessor: Loop interface shall incorporate 32-bit RISC processor. Isolated "watchdog" circuit shall monitor microprocessor and upon failure shall activate system trouble circuits on display. Microprocessor shall access system program for all control-by-event (CBE) functions. System program shall not be lost upon failure of both primary and secondary power. Programming shall support Boolean logic including AND, OR, NOT, TIME DELAY functions for maximum flexibility.
18. Auto Programming: System shall provide for all SLC devices on any SLC loop to be pre-programmed into system. Upon activation of auto programming, only devices that are present shall activate. This allows for system to be commissioned in phases without need of additional downloads.
19. Environmental Drift Compensation: System shall provide for setting Environmental Drift Compensation by device. When detector accumulates dust in chamber and reaches unacceptable level but yet still below allowed limit, control panel shall indicate maintenance alert warning.

When detector accumulates dust in chamber above allowed limit, control panel shall indicate maintenance urgent warning.

20. NON-FIRE Alarm Module Reporting: Non-reporting type ID shall be available for use for energy management or other non-fire situations. NON-FIRE point operation shall not affect control panel operation nor shall it display message at panel LDC. Activation of NON-FIRE point shall activate control by event logic, but shall not cause indication on control panel.
21. 1-Man Walk Test:
    a. System shall provide both basic and advanced walk test for testing entire fire alarm system. Basic walk test shall allow single operator to run audible tests on panel. All logic equation automation shall be suspended during test and while annunciators can be enabled for test, all shall default to disabled state. During advanced walk test, field-supplied output point programming shall react to input stimuli, such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch input. Advanced test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device, and wiring operation/verification.
    b. Test feature is intended to provide for certain random spot testing of system and is not intended to comply with requirements of testing fire alarm systems in accordance with NFPA 72, as it is impossible to test all functions and verify items such as annunciation with only 1 person.
22. Signaling Line Circuits: Each ILI-MB-E3 module shall provide communication with analog/addressable (initiation/control) devices via 2 signaling line circuits. Each signaling line circuit shall be capable of being wired Class B, Style 4 or Class A, Style 6. Circuits shall be capable of operating in NFPA Style 7 configuration when equipped with isolator modules between each module type device and isolator sensor bases. Each circuit shall communicate with a maximum of 159 analog sensors and 159 addressable monitor/control devices. Unique 40-character identifier shall be available for each device. Devices shall be of the Velocity series with capability to poll 10 devices at a time with a maximum polling time of 2 seconds when both SLCs are fully loaded.
23. Notification Appliance Circuits: 2 independent NAC circuits shall be provided on ILI-MB, polarized and rated at 2 amperes DC per circuit, individually over current protected and supervised for opens, grounds, and short circuits. They shall be capable of being wired Class B, Style Y or Class A, Style Z.
24. Alarm Dry Contacts: Provide alarm dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system alarm occurs.
25. Supervisory Dry Contacts: Provide supervisory dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system supervisory condition occurs.
26. Trouble Dry Contacts: Provide trouble dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system trouble occurs.

H. Auxiliary Switch Module (ASM-16):
1. Each ASM-16 has 16 programmable push-button switches.
2. Each push-button switch has 3 associated status LEDs (red, yellow, and green), configurable to indicate any combination of functions.
3. Flexible switch configurations to allow auxiliary functions.
4. An insertable label to identify function of each switch and LEDs combination.
5. Provide capability to communicate with up to 16 ASM-16 modules locally, or up to 3,000 feet from the Control Panel

I. Network Repeater Module RPT-E3:
1. Intelligent Network Interface shall provide interconnection and protection of remote Control Panels. Repeater shall regenerate and condition token passing, 625 K baud signal between units. Repeater shall be available in wire, fiber, or wire/fiber configurations as determined by field conditions.
2. Fiber configurations shall use "ST"-type connectors and be able to operate with up to 200-micron multi-mode fiber, but optimize for 62.5/125. Interface shall have jumper to allow selection of ground detection of wiring when used in wire mode. Interface shall have integral LEDs to display current status of board.

J. Network Graphic Annunciator (NGA): Networked, 1/4 VGA, touch-screen annunciator with the following characteristics:
1. Custom Graphics: Panel shall permit uploading of custom bit-mapped graphic to display screen. Graphic shall display when all systems are normal.
2. Intuitive Functions: In alarm or trouble condition, annunciator shall display only information pertaining to event, including control switches.
   a. Trouble Condition: Display shall indicate cause of trouble. Only controls available to operator shall be Acknowledge and Reset functions.
   b. Alarm Condition: Display shall indicate cause of alarm. Only controls available to operator shall be Acknowledge, Silence, and Reset functions.

2.4 SUPPLEMENTAL NOTIFICATION APPLIANCE CIRCUIT (HPF24)

A. Supplemental Notification Appliance Circuit (HPF24) shall be either Model HPF24S6 or HPF24S8, as indicated on drawings, offering up to 6.0 amps (4.0 amps continuous) or 8.0 amps (6.0 amps continuous), respectively, of regulated 24-volt power. HPF24 shall include the following features:
1. Integral Charger: Charge up to 18.0 amp-hour batteries and support 60-hour standby.
2. 2 Input Triggers. Input trigger shall be Notification Appliance Circuit (from fire alarm control panel) or relay.
3. Surface-mount back box.

4. Ability to delay AC fail delay in accordance with applicable NFPA requirements.
5. Power limited circuitry in accordance with applicable UL standards.
6. Operates as sync follower or a sync generator

2.5 SYSTEM PERIPHERALS

A. Addressable Devices – General:
1. Provide address-setting means using rotary-decimal switches.
2. Use simple to install and maintain decade-type (numbered 0 to 15) address switches by using standard screwdriver to rotate 2 dials on device to set address. Devices which use binary address set via dipswitch packages, handheld device programmer, or other special tools for setting device address shall not be acceptable.
3. Detectors: Analog and addressable. Connect to fire alarm control panel's Signaling Line Circuits.
4. Addressable Thermal and Smoke Detectors: Provide 2 status LEDs. Both LEDs shall flash under normal conditions, indicating detector is operational and in regular communication with control panel, and both LEDs shall be placed into steady illumination by control panel, indicating alarm condition has been detected. If required, flashing mode operation of detector LEDs can be programmed off via fire control panel program.
5. Fire Alarm Control Panel: Permit detector sensitivity adjustment through field programming of system. Sensitivity can be automatically adjusted by panel on time-of-day basis.
6. Using software, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. Detectors shall be listed by UL as meeting calibrated sensitivity test requirements of NFPA 72, Chapter 7.
7. Detectors shall be ceiling-mounted and shall include separate twist-lock base with tamper-proof feature.
8. Following bases and auxiliary functions shall be available:
   a. Standard base with remote LED output.
   b. Sounder base rated at 85 dBA minimum.
   c. Form-C relay base rated 30 VDC, 2.0 A.
   d. Isolator base.
9. Detectors shall provide test means whereby they will simulate alarm condition and report that condition to control panel. Such test shall be initiated at detector itself by activating magnetic switch or initiated remotely on command from control panel.
10. Detectors shall store internal identifying type code that control panel shall use to identify type of device (PHOTO, THERMAL).

B. Addressable Manual Stations (MS-7AF):

1. Manual Fire Alarm Stations: Non-code, non-break glass type, equipped with key lock so they may be tested without operating handle.
2. Operated Station: Visually apparent, as operated, at a minimum distance of 100 feet (30.5 m) from front or side.
3. Stations shall be designed so after actual activation, they cannot be restored to normal except by key reset.
4. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on cover. The word FIRE shall appear on front of stations in raised letters, 1.75 inches (44 mm) or larger.
5. Addressable manual stations shall, on command from control panel, send data to panel representing state of manual switch and addressable communication module status.

C. Intelligent Thermal Detectors (ATD-L2F, ATD-HL2F): Intelligent addressable devices rated at 135 degrees F (58 degrees C) and 190 degrees F (73 degrees C), respectively. Connect via 2 wires to fire alarm control panel signaling line circuit.

D. Intelligent Photoelectric Smoke Detectors (ASD-PL2F): Use photoelectric (light-scattering) principal to measure smoke density and shall, on command from control panel, send data to panel representing analog level of smoke density.

E. Intelligent Duct Smoke Detectors (ADPF):
1. In-Duct Smoke Detector Housing: Use on-board intelligent photoelectric detector, which provides continuous analog monitoring and alarm verification from panel.
2. When sufficient smoke is sensed, alarm signal is initiated, and appropriate action taken to shut down or change over air handling systems to help prevent rapid distribution of toxic smoke and fire gases throughout areas served by duct system.
3. Duct Smoke Detectors Mounted Above Ceiling or Otherwise Obstructed from Normal View: Provide with remote alarm indicator.
4. Each Detector: Install in either supply side or return side duct in accordance with local mechanical code.

F. Addressable Dry Contact Monitor Modules (AMM-2F):
1. Provide to connect 1 supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to 1 of the fire alarm control panel SLCs.
2. Mount in standard deep electrical box.
3. IDC Zone: Suitable for Style B operation.

G. Addressable Dry Contact Monitor Modules (AMM-4F):
1. Provide to connect 1 supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to 1 of the fire alarm control panel SLCs.
2. Mount in 4-inch (102-mm) square, 2-1/8-inch (54-mm) deep electrical box.

3. IDC Zone: Suitable for Style D or Style B operation.
4. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

H. Addressable Dry Contact Monitor Modules (AMM-2IF):
1. Provide to connect 2 supervised IDC zones of conventional alarm initiating devices (any N.O. dry contact device) to 1 of the fire alarm control panel SLCs.
2. Mount in 4-inch (101.6-mm) square, 2-1/8-inch (54-mm) deep electrical box.
3. IDC Zones: Suitable for Style B operation.
4. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

I. Addressable Dry Contact Monitor Modules (MMI-10F):
1. Provide to connect 10 supervised Style B IDC zones or 5 supervised Style D IDC zones of conventional alarm initiating devices (any N.O. dry contact device) to 1 of the fire alarm control panel SLCs.
2. Mount in factory-supplied MBB-2 or MBB-6 enclosure.
3. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

J. 2-Wire Detector Monitor Modules (AMM-4SF):
1. Provided to connect 1 supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
2. Mount in 4-inch (101.6-mm) square, 2-1/8-inch (54-mm) deep electrical box or to optional surface-mounted back box.
3. IDC Zone: Wired for Class A or B (Style D or Style B) operation.
4. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

K. 2-Wire Detector Monitor Modules (MMI-6SF):
1. Provided to connect 6 supervised Class B IDC zones of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
2. Mount in factory-supplied MBB-2 or MBB-6 enclosure.
3. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

L. Addressable Control Modules (AOM-2SF):
1. Provide to supervise and control operation of 1 conventional NAC of compatible, 24-VDC powered, polarized audio/visual notification appliances or UL-listed polarized relays for fan shutdown and other auxiliary control functions.
2. Mount in standard 4-inch (101.6-mm) square, 2-1/8-inch (54-mm) deep electrical box or to surface-mounted back box.
3. Control Module NAC: Wire for Style Z or Style Y (Class A/B) with up to 1 amp of inductive signal or 2 amps of resistive signal operation. Relay coil shall be

magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.

4. Audio/Visual Power: Provide by separate supervised power circuit from main fire alarm control panel or from supervised, UL-listed remote power supply.

M. Addressable Control Modules (MMO-6SF):
1. Provide to supervise and control operation of 1 conventional NAC of compatible, 24-VDC powered, polarized audio/visual notification appliances or UL-listed polarized relays for fan shutdown and other auxiliary control functions.
2. Mount in factory-supplied MBB-2 or MBB-6 enclosure.
3. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.
4. Control module NAC: Wire for Style Z or Style Y (Class A/B) with up to 1 amp of inductive signal or 2 amps of resistive signal operation. Relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.
5. Audio/Visual Power: Provide by separate supervised power circuit from main fire alarm control panel or from supervised, UL-listed remote power supply.

N. Addressable Relay Modules (AOM-2RF):
1. Available for HVAC control and other building functions. Relay shall have 2 Form C sets of contacts that operate in tandem and are rated for a minimum of 2.0 amps resistive or 1.0 amps inductive. Relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.
2. Mount in standard 4-inch (101.6-mm) square, 2-1/8-inch (54-mm) deep electrical box or to surface-mounted back box.

O. Addressable Relay Modules (MMO-6RF):
1. Available for HVAC control and other building functions. Relay shall be Form C and rated for a minimum of 2.0 amps resistive or 1.0 amps inductive. Relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.
2. Mount in factory-supplied MBB-2 or MBB-6 enclosure.
3. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

P. Isolator Modules (M500X):
   1. Provide to automatically isolate wire-to-wire short circuits on SLC Class A or Class B branch. Isolator module shall limit number of modules or detectors that may be rendered inoperative by short-circuit fault on SLC loop segment or branch. At least 1 isolator module shall be provided for each floor or protected zone of building. No more than 25 devices shall be connected to 1 isolator module.
   2. If wire-to-wire short occurs, isolator module shall automatically open-circuit (disconnect) SLC. When short-circuit condition is corrected, isolator module shall automatically reconnect isolated section.
   3. Does not require address-setting, and its operations shall be totally automatic. Not necessary to replace or reset isolator module after normal operation.
   4. Mount in standard 4-inch (101.6-mm) deep electrical box or in surface-mounted back box.
   5. Single LED: Flash to indicate isolator is operational and illuminate steadily to indicate short-circuit condition has been detected and isolated.

Q. Addressable Projected Beam Detectors (ABD-2F):
   1. Single-ended, reflective design.
   2. Six user-selectable sensitivity levels.
   3. Operates in range from 16 feet to 328 feet.
   4. Temperature Range of Device: Minus 22 degrees F to 131 degrees F.
   5. Beam Detector: Automatic gain control to compensate for gradual signal deterioration from dirt accumulation on lenses.
   6. UL LIsted.
   7. Ability to be tested using calibrated test filters or magnet-activated remote test station.

R. Sprinkler Waterflow Switches (provided and installed by the sprinkler contractor):
   1. Integral, mechanical, non-coded, non-accumulative retard type.
   2. Alarm transmission delay time conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30 to 45 seconds.
   3. Single manufacturer and series.
   4. Where possible, locate waterflow switches a minimum of 1 foot from fitting which changes direction of flow and a minimum of 3 feet from valve.
   5. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.

S. Sprinkler and Standpipe Valve Supervisory Switches (provided and installed by the sprinkler contractor):
   1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with supervisory switch. Standpipe hose valves, test valves, and drain valves shall not be equipped with supervisory switches.

2. PIV (Post Indicator Valve) or Main Gate Valves: Equip with supervisory switch.
3. Mount not to interfere with normal operation of valve and adjust to operate within 2 revolutions toward closed position of valve control, or when stem has moved no more than one-fifth of distance from normal position.
4. Contain in weatherproof aluminum housing, which shall provide 3/4-inch (19-mm) conduit entrance and incorporate necessary facilities for attachment to valves.
5. Switch Housing Finish: Red baked enamel.
6. Entire Installed Assembly: Tamper proof and arranged to cause switch operation if housing cover is removed or if unit is removed from mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

T. Graphic Annunciator (Uses ANU-48 Serial Driver Board):
1. Communicate to fire alarm control panel via EIA-485 (multi-drop) 2-wire communications loop. Up to 16 annunciator drivers, each configured up to 48 points, shall be connected per ILI-MB-E3.
3. ANU-48: Provide interface to approved UL-listed graphic-style annunciator and provide each of the features specified.

U. Remote LCD Display Annunciator:
1. Furnish and install as indicated on the Drawings a remote serial annunciator, Model LCD-7100. Annunciator shall provide 80-character display, which shall duplicate all information on basic system display, including any network nodes its host panel is annunciating, with exception of menus. Contain the following function keys:
   a. Alarm Acknowledge.
   b. Trouble Acknowledge.
   c. Signal Silence.
   d. System Reset/Lamp Test.
   e. System Drill Test.
2. Key Lock: Enable switches only when placed in "ON" position, with exception of Trouble Acknowledge, which is used to silence local trouble audible sounder. Annunciator shall contain the following LEDs:
   a. Alarm.
   b. Supervisory.
   c. System Trouble.
   d. Power Fault.
   e. System Silenced.
3. Mount on standard 3-gang surface or flush electrical box.
4. Each ILI-MB-E3: Accommodate up to 5 remote LCD-7100 annunciators which shall be located up to 3,000 feet from control panel.

V. Horns: System Sensor "SpectrAlert Advance"
1. Operate on 24 VDC or with field-selectable outputs.

2. Have two selectable tone options of temporal 3 and non-temporal continuous pattern.
3. Have at least 2 audibility options

W. Strobes: System Sensor "SpectrAlert Advance"
1. Compliance: ADA and UL 1971.
2. Maximum Pulse Duration: 0.2 second.
3. Strobe Intensity: UL 1971.
4. Flash Rate: UL 1971.
5. Strobe Candela Rating: Determine by positioning selector switch on back of device.

X. Horn/Strobes: System Sensor "SpectrAlert Advance"
1. Operate on 24 VDC
2. Have two selectable tone options of temporal 3 and non-temporal continuous pattern.
3. Have at least 2 audibility options
4. Maximum Pulse Duration: 0.2 second.
5. Strobe Intensity: UL 1971.
6. Flash Rate: UL 1971.
7. Strobe Candela Rating: Determine by positioning selector switch on back of device.

2.7 WIRING

A. Conduit:
1. EMT: Allied Tube & Conduit "Fire Alarm Red" steel EMT conduit, or equivalent.
2. Others: Where fire alarm raceway is not buried underground, it shall be painted red.

B. Cables & Conductors:
1. Optical Fiber Cable: As per Data Specification.
2. Signaling Line Circuit Cable:
   a. OSP: West Penn #AQ225 (Black Jacket)
   b. ISP: West Penn #D980 (Red Jacket)
3. Notification Appliance Circuit Cable:
   a. OSP: West Penn #AQ227 (Black Jacket)
   b. ISP: West Penn #974 (Red Jacket)
3. Voice Evacuation Speaker Cable: Not required.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces to receive fire alarm system.
   1. Notify Architect of conditions that would adversely affect installation or subsequent use.
   2. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Install fire alarm system in accordance with NFPA 72, NFPA 70, state and local codes, manufacturer's instructions, and as indicated on the Drawings.

B. Smoke detectors shall neither be installed within 36 inches of any HVAC supply or return air grille, to include air handling light fixtures, nor within 12 inches of any wall.

C. Smoke detectors shall not be installed before system programming and test period. If construction is ongoing during this period, take measures to protect smoke detectors from contamination and physical damage.

D. Wall mounted notification appliances shall be installed not lower than 80 inches and not higher than 96 inches, above finished floor. Devices shall be not be mounted within 6 inches of the ceiling.

E. All fire alarm devices shall be accessible for periodic maintenance. Should a device location indicated in the Contract Documents not meet this requirement, it shall be the responsibility of the Contractor to bring it, in writing, to the attention of the Engineer.

F. Flush-mount fire detection and alarm system devices, control panels, and remote annunciators in finished areas. Flush-mount or surface-mount fire detection and alarm system devices, control panels, and remote annunciators in unfinished areas.

G. Ensure manual stations are suitable for surface mounting or semi-flush mounting as indicated on the Drawings. Install stations at 48 inches above finished floor, measured to operating handle.

H. End of Line Resistors shall be furnished as required by the manufacturer. Devices containing end-of-line resistors shall be appropriately labeled so as not to require removal to identify the EOL device.

I. Addressable modules shall be mounted within 36 inches of the monitored or controlled point of termination. This shall include, but is not necessarily limited to,

fan shutdown, elevator recall, shunt trip, sprinkler status points, or door release. Label all addressable modules as "FIRE ALARM SYSTEM" and to their function, e.g., "FAN F-1 SHUTDOWN".

J. Conduit/Raceways, Junction Boxes:
1. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
2. The fire alarm system cabling / wiring shall be installed in RED color conduit, minimum size 3/4". In upgrade projects, existing fire alarm system conduit may be reused, if serviceable. Paint existing conduits red to match new.
2. All junction box covers shall be painted red.
2. Minimum conduit size shall be 3/4" trade size.
3. Conceal conduit, junction boxes, and conduit supports and hangers in finished areas. Conceal or expose conduit, junction boxes, and conduit supports and hangers in unfinished areas. Concealed installation is preferred wherever possible.

K. Cables & Conductors:
1. Cables & conductors shall be labeled at both ends as to their origin and destination; e.g. "FACP - i1-1" indicates the origin as the FACP and the destination as initiation device "i1-1". Utilize Panduit labels (or equivalent), size MP-150c through MP-350, as required by the amount of information on the label.
2. Splices in wiring are permitted only at terminal cabinets, or locations specifically approved by the Engineer. Do not splice in conduit, pull boxes, inaccessible locations, etc.

L. Terminal Cabinets:
1. Wiring shall be neatly bundled, fanned, tagged, and laced. Leave minimum three inches fan space between terminal block connection and vertical wiring. Incoming wiring shall terminate on the left, outgoing on the right.
2. Wire terminations at devices and terminal strips shall be "spade" type terminal connections, Sta-Kon, or equivalent.
3. Terminal barrier strips shall be Cinch 142 series (or equivalent) with minimum six points. Leave minimum two space separation between types of system cables. Provide minimum four spare termination points.

M. Coordinate the required space in the Data equipment frames with this and other network based systems. Provide racks with sufficient space to accommodate all systems.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide service of competent, factory-trained technician authorized by manufacturer to technically supervise and participate during pre-testing and acceptance testing of system.

B. Testing:
   1. Conduct complete visual inspection of control panel connections and test wiring for short circuits, ground faults, continuity, and insulation before energizing cables and wires.
   2. Close each sprinkler system control valve and verify proper supervisory alarm at Control Panel.
   3. Verify activation of flow switches.
   4. Open initiating device circuits and verify that trouble signal actuates.
   5. Open signaling line circuits and verify that trouble signal actuates.
   6. Open and short notification appliance circuits and verify that trouble signal actuates.
   7. Ground initiating device circuits and verify response of trouble signals.
   8. Ground signaling line circuits and verify response of trouble signals.
   9. Ground notification appliance circuits and verify response of trouble signals.
   10. Check installation, supervision, and operation of intelligent smoke detectors.
   11. Introduce on system each of the alarm conditions that system is required to detect. Verify proper receipt and proper processing of signal at Control Panel and correct activation of control points.
   12. Consult manufacturer's manual to determine proper testing procedures when system is equipped with optional features. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality, and similar.

C. Acceptance Testing:
   1. The contractor's job foreman and an assistant, in the presence of a representative of the manufacturer, an assigned representative of the Owner, and the assigned inspector of the AHJ, shall perform a test of the system. All attending personnel shall be given reasonable notice so as to make themselves available for the test.
   2. Operate every installed device to verify proper operation and correct annunciation at the control panel.
   2. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.
   3. Completely disconnect main Control Panel from rest of network. Activate initiating device. All control outputs supported by transponder SLC circuits shall operate under project programming mode. Default or degrade mode programming shall not be acceptable.
   4. Complete any additional testing required by the AHJ.

5. When testing has been completed to satisfaction of both Contractor's job foreman, representatives of the manufacturer and Owner, and the inspector of the AHJ, a notarized letter co-signed by each attesting to satisfactory completion of said testing shall be forwarded to the Owner and fire department.
6. Leave fire alarm system in proper working order and, without additional expense to Owner, replace defective materials and equipment provided within 1 year (365 days) from date of final acceptance by the owner.

3.4 DEMONSTRATION

A. Provide instruction as required for operating fire alarm system.

B. Provide hands-on demonstrations of operation of fire alarm system components and functions.

END OF SECTION

SECTION 31 00 00

OFFSITE DEVELOPMENT

PART 1 - GENERAL

1. RELATED SECTIONS:

   A. Division 31 Sections as applicable to earthwork cutting, filling, grading and trenching.

2. DESCRIPTION

   A. Work Included: Furnishing all labor, materials and equipment necessary to provide and construct street improvements to the governing agency Standards.

3. QUALITY ASSURANCE:

   A. Standards: Comply with the following standards:

      A. City of Fresno Standard Drawings and Specifications, latest edition.

   B. All work shall comply with the rules and regulations of the Division of Industrial Safety and all other local, state and federal agencies having jurisdiction. Nothing contained herein shall be construed as permitting work that is contrary to such rules, regulations and codes. Full compensation for all costs involved in worker protection from excavation cave-in shall be included in the lump sum price bid for the work under this contract.

4. SUBMITTALS

   A. Comply with all governing agency requirements regarding submittals.

   B. Submit all test reports for compaction.

5. SCOPE OF WORK

   A. Street improvements include, but are not limited to, saw cutting, concrete removal, construction of concrete driveway, sidewalk, ramp, curb and gutter as indicated on the Plans, in these Specifications, and in conformance with the City of Fresno Standard Plans and Specifications.

6. EXISTING CONDITIONS

A. Contractor shall be held to have visited the site prior to submitting proposal to determine existing conditions, nature of materials to be encountered and to evaluate other information concerning or affecting the work to be performed under the contract.

B. Before commencing excavation, the Contractor shall notify all utility authorities or utility companies having possible interest in the work of the Contractor's intention to excavate proximate to existing facilities and Contractor shall verify the location of any utilities within the work area.

C. The Engineer has made a diligent attempt to show on the Construction Drawings all pertinent intersecting utilities which may affect the work. Utilities shown in profile view are shown at their most probable locations, based upon available as-built drawings and known construction custom. The Contractor shall exercise caution while performing excavation for this project and shall protect existing utilities from damage, inasmuch as their exact location is unknown until exposed by the excavation.

D. Because of the close proximity of certain existing parallel or intersecting utilities and the depth of the proposed facilities, it may be necessary for the Contractor to provide special protection for the existing utility, and/or provide for its temporary and/or permanent relocation in order to construct the facilities shown on the Plans. Bracing of power poles may be necessary. The Contractor shall coordinate said work and shall be responsible for complying with the requirements of the utility authority involved. Full compensation for all costs involved in such special protection and/or relocation, including all appurtenances and incidentals, shall be included in the amount bid for the various bid items, and no separate payment shall be made therefor.

E. All existing utility mains and service lines shall be kept in constant service during the construction of this project. Hand excavating shall be employed where necessary to safely expose existing utilities.

F. Full compensation for all costs involved in locating, verifying, protecting, exposing, relocating, reconstructing and otherwise providing for utilities shall be included in the amount bid for the various items of work and no separate payment shall be made therefor.

7. DUST CONTROL

A. Contractor shall comply with all requirements of the San Joaquin

Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.

B. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.

C. No construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan, if one is required..

D. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.

E. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefor.

8. TRAFFIC CONTROL

A. A traffic control plan, if required by the City of Fresno, shall be submitted by the Contractor to the City of Fresno for review and approval prior to the issuance of the Encroachment Permit.

B. Traffic control measures shall be fully and completely carried out at all times to the satisfaction of the City of Fresno. If the Contractor fails to provide satisfactory traffic control the Owner may obtain services from other sources and deduct from the contract the cost thereof.

C. Through traffic shall be provided for during non-working hours including, but not limited to, weekends, holidays and at night.

D. The Contractor shall comply with all requirements of the City of Fresno Encroachment Permit.

E. Full compensation for traffic control shall be included in the amount bid for the various items of work and no separate payment will be made therefor.

9. PROTECTIVE MEASURES

A. Furnish, place, and maintain all supports, shoring, and sheet piling which may be required for the sides of excavation or for protection of adjacent existing improvements. The adequacy of such systems shall be the complete responsibility of the Contractor.

B. Maintain all bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed. Reference is made to 310000.1.11.B.

C. Forty-eight (48) hours prior to beginning construction, the Contractor shall notify the owners of all properties adjacent to the proposed construction. The Contractor shall also provide the property owners with an estimate of the length of time that their properties will be affected by his construction activities.

10. PERMITS

A. The Contractor shall secure and pay for all permits required for work under this contract including, but not limited to, the City of Fresno Encroachment Permit.

B. All costs associated with obtaining permits as required by construction and as indicated herein shall be included in the price bid for the various items of work and no separate payment will be made therefor.

C. The Contractor shall obtain a permit from the Division of Industrial Safety of the State of California prior to the commencement of construction. Full compensation for said permit shall be included in the price bid for the various items of work and no separate payment will be made therefor.

11. FEES

A. Fees for the offsite improvements are clarified as follows:

A. Fees to be paid by the Contractor and to be included as part of his bid:

a. Permit Fees

B. Fees to be paid by the Owner:

a. Plan Review Fees
b. Inspection Fees
c. Utility Connection Fees (Developer Fees)

B. The Contractor shall also be responsible to secure and pay for all City of Fresno required bonds and insurance. All references made by the “General Notes for Street Construction” to the "Developer" shall be interpreted to mean "Contractor", except "The Owner shall pay for all initial compaction tests". Contractor shall pay for all required retests.

12. FINISH ELEVATIONS AND LINES

A. The Contractor is responsible for layout of all work. Provide layout by a licensed California Civil Engineer or Land Surveyor.

B. Carefully preserve all data and monuments set by the Owner's Civil Engineer and, if displaced or lost, the Contractor's Civil Engineer or Land Surveyor shall immediately replace such monuments to the satisfaction of the Owner's Civil Engineer and at no additional cost to the Owner.

13. REPRESENTATION ON PLANS

A. The basic topographic ground feature information shown on the Plans was obtained by field survey. The Contractor shall carefully examine the site of work and shall satisfy himself as to the conditions to be encountered, any changes thereto which have occurred, and any condition or feature which needs additional investigation.

14. MONITORING OF CONSTRUCTION SITE

A. The Contractor shall monitor the construction site on a regular basis during non-working hours, including weekends and holidays to ensure that no situations arising, relating to the condition of the work site, which could pose a threat to public safety. In addition the contractor shall furnish to the Owner and City of Fresno Construction Management, prior to the issuance of the "Notice to Proceed", a list of persons, together with their addresses and home telephone numbers, who are authorized to act on behalf of the Contractor in an emergency arising out of conditions at the work site after normal working hours.

B. Safe pedestrian crossings shall be maintained at all existing crosswalks and intersections. The Contractor shall secure the site of work at all times. Children shall not be allowed in or along the excavation, on spoil piles or at other undesirable locations within the work. The Contractor shall provide suitable traffic and pedestrian warning devices and signs necessary at or near the work as required by safety considerations and/or jurisdictional authorities. Convenient pedestrian detours and/or flagmen and/or safe temporary bridges over excavations, complete with adequate safety rails, shall be provided as necessary.

15. COMPACTION AND COMPACTION TESTS

A. The Contractor shall be fully responsible for timely compaction and suitability of material for compaction. Where necessary, wet and pumping material shall be removed from the trench or excavation by the Contractor and replaced with suitable approved material as necessary to complete operations within the times allowed.

B. Prior to commencing construction of surface improvements, obtain approval from City of Fresno for adequate compaction of the subgrade to ascertain that there are no soft or spongy areas requiring repair.

C. Compaction requirements for all excavations within public streets shall be in accordance with the City of Fresno Encroachment Permit and in accordance with the City of Fresno Standard Specifications.

D. Initial compaction testing shall be provided by the Owner. The Contractor shall file adequate notice to the engineer when he desires compaction testing. All required compaction retesting of backfill because of failure to pass the initial compaction test shall be at the expense of the Contractor. Full compensation for all costs involved in meeting and satisfying the above requirements shall be included in the amount bid for the various items of work and no separate payment will be made therefor.

16. RECORD DRAWINGS

A. Comply with all requirements of Division 01 of these Specification Sections.

PART 2 - MATERIALS

A. All materials incorporated in off-site construction shall conform with the City of Fresno Standard Drawings and Specifications

PART 3 - EXECUTION

A. Construction of street improvements shall be performed in accordance with the City of Fresno Standard Drawings and Specifications.

B. The Contractor shall be responsible to protect all other existing utilities and improvements affected by his work.

C. The Contractor shall cooperate with all other contractors on the job to insure that his activities do not delay or hinder the construction activities of others.

D. The Contractor shall be aware that the work of this contract is a portion of the total work required for the construction of the on-site improvements. The Contractor shall coordinate his work and his schedule fully with other forces performing work on the site. Included in these "other forces" are utility companies, the forces constructing on-site improvements for the above stated site development and any other forces performing work within the project area which requires coordination with the work of this contract.

E. The Contractor shall coordinate his efforts with other forces performing on-site work such that said forces are provided with adequate access to the site.

END OF SECTION

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SECTION 31 11 00

SITE CLEARING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely clear and demolish all materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. Related Sections include the following:
   1. Contract General Conditions and Division 1, General Requirements
   2. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading
   3. Section 31 22 22 – Soil Materials
   4. Section 31 23 00 – Trench Excavation and Backfill

C. Submittals
   1. Closeout Submittals
      a. Project Record Documents in accordance with Specification Section PROJECT DOCUMENTS.
         1) Identify and accurately locate capped utilities, subsurface structures, electrical and mechanical conditions.

D. Quality Assurance
   1. Regulatory Requirements
      a. In accordance with Specification Section Regulatory Requirements, and the following:
         1) Materials and equipment used for this project shall comply with the current applicable regulations of the California Air Resources Board [CARB] and the Environmental Protection Agency [EPA].
   2. Meetings
      a. Minimum agenda shall be to discuss coordination of upcoming work, review the work progress, discuss field observations, identification of any potential problems which may impede planned progress; corrective measures to regain projected schedule; and maintenance of quality and work standards.
      b. Meetings shall include Pre-Clearing and Demolition Meetings.
      c. Participants (or designated representative of) invited to attend each of the above meetings shall be as follows:
         1) Contractor.

2) Owner.
3) Architect.
4) Testing Laboratory.
5) Local Governing Authorities as applicable.
6) Utility Representatives as applicable.
7) Owner's Inspector.
8) Clearing and Demolition Subcontractor.
9) Other subcontractors, as appropriate (including any accessory subcontractors).

E. Project Conditions or Site Conditions
1. Dust Control
a. Contractor shall comply with all requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.
b. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.
c. No construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan.
d. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.
e. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefore.
2. Existing Conditions
a. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
b. Conduct work so as not to interfere unnecessarily with adjacent roads, streets, drives, walks or occupied facilities.
1) Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and Authorities having jurisdiction.

2) Provide alternate routes around closed or obstructed traffic ways if required by Authorities having jurisdiction.

c. Locate and identify utilities.
   1) Call a Local Utility Locator Service (USA – "Underground Service Alert" – [800] 227-2600) for the task of locating any applicable utilities in the area where the Project is located.

d. Carefully remove items indicated to be salvaged and store on Owner's premises at the Owner's direction.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.01 Preparation

A. Coordination
   1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.

B. Protection
   1. Protect and maintain all benchmarks and survey control points from disturbance during clearing and demolition operations.
   2. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties.
   3. Furnish and install temporary protection/barrier fencing surrounding the limits of demolition.
   4. Protect trees, plant growth, and features not specifically designated for removal. Locate and clearly flag trees and vegetation to remain or to be relocated.
   5. Protect existing improvements designated to remain from damage during construction.
      a. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.02 Construction

A. Shrub and Weed Removal:
   1. Remove weeds and rooted topsoil to a minimum six inch depth and temporarily stockpile as needed for re-use in finished grading of landscape areas. Remove excess material from the site.

2. Where existing vegetation is to be replaced by new materials, remove contaminated or excess soil from the site and legally dispose of off-site.

B. Existing Site Improvements Removal:
1. Remove existing above and below grade improvements as necessary to facilitate new construction.
a. Remove all concrete slabs, curbs, mow strips, gutters, and fencing.
1) Neatly saw-cut length of existing pavement to remain before removing existing pavement unless existing full-depth joints coincide with line of demolition. Saw-cut faces vertically.
b. Remove indicated utility improvements within the limits of construction.
1) Excavate for and disconnect, seal or cap off underground utilities designated to be removed.
2) Coordinate removal and/or relocation of utilities with the appropriate utility agencies.
3) Where existing underground utilities, irrigation pipes, wells, leach fields, or underground tanks are encountered, they must be removed or moved to a point at least 5 feet horizontally outside the future building and 3 feet horizontally outside the concrete flatwork or pavement construction areas. All resultant cavities must be backfilled with engineered fill.

C. Existing Utilities to Remain or be Relocated:
1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
a. Notify Architect and the Owner not less than seven (7) days in advance of proposed utility interruptions.
b. Arrange to shut off indicated utilities with utility companies.

D. Disposal:
1. Legally dispose of all debris (surplus soil materials, unsuitable topsoil, obstructions, demolished materials, waste materials, trash, etc.) resulting from clearing, grubbing, demolition and from construction. Disposal of all materials shall be at a location secured by the Contractor off of the Owner's property.

END OF SECTION

SECTION 31 20 00

EARTHWORK: EXCAVATION, FILLING, GRADING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Excavating soil and other material for surface improvements.
   2. Placing fill.
   3. Compaction of existing ground and fill.
   4. Preparation of subgrade for other improvements.
   5. Grading of soil.

B. Related Sections include the following:
   1. Contract General Conditions and Division 1, General Requirements.
   2. Section 31 11 00 – Site Clearing.
   3. Section 31 22 22 – Soil Materials.
   4. Section 31 23 00 – Trench Excavation and Backfill.

1.02 REFERENCES

A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

B. Geotechnical Engineering Report

1.03 DEFINITIONS

A. Utility: Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.04 SUBMITTALS

A. Submit in accordance with Specification Section - Submittal Procedures:
   1. Product Data:
      a. Information indicating the source of all import material, the fill material type and where it is to be used. Import material must be approved by District's inspector prior to being brought on site.
   2. Quality Assurance/Control:
      a. Material Test Reports:
         1) Classification of Soils.

2) Compaction Characteristics of Soils.
3) Density and Unit Weight of Soils in Place.

3. Project Closeout: In accordance with Specification Section – PROJECT CLOSEOUT.
   a. Drawings indicating the extent and depth of all engineered fill. This information shall be a part of the Project "As-Built" and Project "Record" Documents in accordance with the Specification Section – PROJECT DOCUMENTS.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Installer:
      a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this project.

B. Regulatory Requirements:
   1. In accordance with Specification Section - REGULATORY REQUIREMENTS and the following:
      a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board [CARB] and the Environmental Protection Agency [EPA].
      b. CF County of Fresno, Codes and Ordinances
      c. EPA Environmental Protection Agency.
      d. CAL/OSHA Comply with all provisions of the Construction Safety Orders and the General Safety Orders of the California Division of Occupational Safety and Health, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground excavations.

C. Certificates:
   1. Installer's certification that all Earthwork installation meets or exceeds the requirements of this specification.
   2. Contractor's certification (on Contractor's letterhead paper) that the Earthwork materials and installation meets or exceeds the requirements of this specification.

D. Meetings:
   1. Pre-Installation: Schedule prior to the start of work.
      a. Coordinate the work with other work being performed.
      b. Identify any potential problems, which may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.

2. Progress: Scheduled by the Contractor during the performance of the work.
   a. Review for proper installation of work progress.
   b. Identify any installation problems and acceptable corrective measures.
   c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
   a. Inspect and identify any problems which may impede issuance of warranties or guaranties.
   b. Maintain installed work until the Notice of Substantial Completion has been filed.

1.06 COORDINATION

A. Coordinate work with Owner's personnel.

B. Provide required notification to the Geotechnical Engineer so that a representative from the Owner's Geotechnical Engineering consultant can be present for all clearing, demolition and grading operations to test and observe earthwork construction.

C. Verify that the location of existing utilities have been indicated at work site by utility authorities and as specified on the Plans.

D. Perform all work in accordance with recommendations of the site geotechnical engineering report.

1.07 EXISTING CONDITIONS

A. Existing Conditions:
   1. Examine the site and verify conditions with the Drawings and Specifications. Contractor shall familiarize himself with existing site conditions and any changes that have occurred at the site since the preparation of the contract documents, and shall be responsible to account for any such changes in the price bid for this work.
   2. Thoroughly investigate and verify conditions under which the Work is to be performed.
   3. Locate and identify utilities:
      a. Call a Local Utility Locator Service (USA - "Underground Service Alert" – [800] 227-2600) for the task of locating any applicable off-site and on-site utilities in the area where the Project is located.
   4. No allowance for extra Work will be granted resulting from negligence or failure to meet requirements of Article titled "Existing Conditions" above.

B. Where subsurface work involves more than the normal depth of excavation required for the removal and/or construction of surface improvements (surface improvements such as concrete work, paving, landscaping, signs, etc.), the Engineer will have made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

C. Under similar circumstance, service laterals and appurtenances will have also been shown where information was available as to their location. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

D. Determine exact location of existing buried utilities by:
   1. Marking on ground or pavement surface the alignment and extent of the facilities and the probable location of existing utilities using construction plans and existing surface features.
   2. Requesting Underground Service Alert (USA) to indicate location of existing buried facilities (phone 1-800-227-2600). Provide USA a minimum of two (2) working days notice of request for locations, and notify Owner of said request concurrently.
   3. Locate exact location of existing utilities by hand methods of excavation, or by use of vacuum equipment.

E. At proposed work location, expose by hand methods (or vacuum equipment) all existing utilities along the route of the proposed work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand (or vacuum equipment) methods to locate all existing facilities as indicated on the plans, and/or as indicated on the ground by USA or Owner's personnel.

F. Provide Field Engineering to record the location of all utilities encountered. Where locational conflicts exist between existing utilities and the planned location of facilities to be constructed under this Contract, submit detailed information to the Engineer's for review and direction.

G. Maintain all existing utility mains and service lines in constant service during construction of the Work.

H. Where service disruptions are allowed, minimize the length of such disruptions by proper scheduling and diligent pursuit of the work.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Dust control: Perform work in a manner as to minimize the spread of dust and flying particles. Thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of other on-site work.
   1. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.
   2. All land clearing, demolition, grubbing, scraping, excavation, land leveling, grading, and cut and fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by pre-soaking.
   3. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions or at least six inches of freeboard space from the top of the container shall be maintained.
   4. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. The use of blower devices is expressly forbidden.
   5. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/ suppressant.
      a. Contractor shall comply with all requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.
      b. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. If required, Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.
      c. If a dust control plan is required, no construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan.
      d. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.
      e. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefore

B. Burning: No burning will be allowed on-site.

C. Rain: Work under this section shall not be started or maintained under threat of rain, unless the work is not affected by the rain.

D. Do not place fill during weather conditions which will alter moisture content of fill materials sufficiently to make compaction to the specified densities difficult or impossible.

E. When reference is made to SWPPP (Storm Water Pollution Prevention Plan, if any within this Project Manual), then comply with all environmental protection requirements included therein.

F. In accordance with EPA and CF.

G. Protection:
   1. Protect cut and fill areas to prevent water running into excavation. Maintain areas free of water. Remove seeping water immediately by pumps.
   2. Protect cut slopes from erosion due to precipitation and other sources of runoff.
   3. Protect utilities to remain within the construction area and special construction. If utility lines are uncovered (water, electric, sewer, etc.) not shown on the drawings during excavation of site, notify the Architect promptly for its review and action.
   4. Do not permit access to undeveloped portions of the site, nor to areas that are outside of the limits of grading.

1.09 PROJECT RECORD DOCUMENTS

A. Submit under provisions of General Conditions and Division 1, General Requirements.

B. Accurately record actual locations of utilities encountered including depth and horizontal location, as measured from permanent site features.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fill in Turf or Other Planting Areas: Type S2 or S3 per Section 31 22 22.

B. Fill in Non-planting Areas: Type S1, S2 or S4 per Section 31 22 22.

C. Imported material: Type S4 or S5 per Section 31 22 22.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

3.02 PREPARATION

A. Layout of Work:
   1. Contractor shall be responsible for all lines and grades.
   2. Check all bench marks, monuments and property lines and verify locations.
   3. Locate and maintain all grade stakes.
   4. Monuments moved or displaced during grading operation are to be replaced by a California Registered Civil Engineer or Surveyor, at Contractor's expense.

B. Locate, identify, and protect existing above and below grade utilities from damage.

C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.

D. Protect existing structures, fences, curbs, sidewalks, paving and other improvements to remain from damage from excavation equipment and vehicular traffic.

E. Employ equipment and methods appropriate to the work site.

F. Protect excavated areas from drainage inflow, and provide for drainage of all excavated areas.

G. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.

3.03 EXCAVATION

A. Over-excavate areas to receive pavement and concrete site improvements to the bottom of the proposed aggregate base section, 12 inches below preconstruction site grades, 12 inches below the bottom of existing

improvements to be removed, or to the depth required to remove any undocumented fill soils, whichever is greater.

B. Excavate below building pads per recommendations of the site geotechnical report.

C. Provide additional excavation as required to conform to the lines, grades and cross-sections shown on the plans.

D. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw.

E. Remove excess soil not to be used as fill in the Work from the site. Unless requested by Owner to be deposited at a site designated by Owner on the property, obtain a disposal site and legally dispose of said excess material, all at no additional cost to the Owner.

3.04 FILLING AND COMPACTING

A. Once clearing, grubbing and over-excavation operations are complete, scarify the surfaces to receive fill material or surface improvements to a depth of 6 inches for exterior slabs and 12 inches for pavement areas. Moisture condition as necessary, and compact as engineered fill to at least 90% of the maximum dry density.

B. Place and compact soil fill to finish subgrade of improvements to be placed thereon, or to finished surface grade where no improvements are to be placed thereon.

C. Conform fill to the lines, grades and cross-sections shown on the plans.

D. All fill placed in improvement areas (structures, pavement and site concrete improvements, is to be placed as engineered fill, as described below:
   1. Place fill materials in layers not exceeding 6 inches in uncompacted thickness, and compact in accordance with 31 20 00/3.04.
   2. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Fill materials shall conform to 31 22 22.

F. Provide, at no additional cost to Owner, imported soil material conforming to the requirements of Section 31 22 22, as needed to attain finished grades of Work.

G. Prior to commencing construction of surface improvements, pass a test roller of size and weight as approved by the Owner over the subgrade to establish the extent of soft or spongy areas requiring repairs.

H. Utilize equipment which will not disturb or damage existing utilities and other improvements.

3.05 FINE GRADING

A. Fine grade all finished surfaces to the lines, grades and cross-sections shown on the plans, and to blend to hard surface improvements.

B. Rake and smooth all finished surfaces not to receive hard surface improvements.

C. Use suitable stockpiled topsoil for the top 12-inches of areas to receive landscape improvements. Stockpiled topsoil may also be used in the top 12-inches of areas which will not receive surface improvements or structures.

D. Topsoil may not be used in areas requiring engineered fill.

3.06 TOLERANCES

A. Top surface of Subgrade for Non-Vegetative Surface Improvements or Layers thereof: Plus or minus 0.02 foot from planned elevation.

B. Top surface of Subgrade for Vegetative Surface Improvements or for Bare Ground - Plus or minus 0.05 foot of planned elevation, or as required for finish surface to match adjacent improvements or ground.

3.07 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of General Conditions and/or Division 1, General Requirements.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.

C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest.

D. All retesting required as a result of failure of initial test will be performed by Owner's testing agency, at the expense of the Contractor.

E. Provide an as-graded survey of the work area, prepared by a licensed surveyor, prior to planting. The as-graded survey shall be provided to the Engineer for review and approval, and shall include grades of all concrete

surface improvements, drain inlet grate elevations, storm drain pipe flowline grades, and all grade points specified on the plans. Any areas where grades do not meet specified tolerances must be corrected and re-surveyed prior to planting

F. Where graded surfaces are not within the tolerances of this section, correct out of tolerance areas and resurvey prior to submitting final as-graded survey.

3.08 PROTECTION

A. Protect graded areas from traffic, freezing, erosion, and all other sources of damage. Keep free of debris and trash.

B. Repair and re-establish grades to specified tolerances where completed or partially completed work becomes eroded, rutted, settled, or where it is damaged by subsequent construction operations or weather.

C. Where settlement occurs prior to acceptance of the work, remove and replace surface improvements, excavate, replace, and re-compact in accordance with these specifications, and restore the surface improvements.

3.09 CLEANING

A. Remove all surplus or unsatisfactory soil material, trash, and debris, and legally dispose of off of the Owner's property.

END OF SECTION

SECTION 31 22 22

SOIL MATERIALS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Excavated (and re-used) materials and imported materials.

B. Materials shall comply with the site geotechnical engineering report recommendations.

C. Related Sections include the following:
   1. Section 31 20 00 - Earthwork: Excavation, Filling and Grading.
   2. Section 31 23 00 - Trench Excavation and Backfill.

1.02 SUBMITTALS

A. Samples: Submit, in air-tight containers, 10 lb. sample of Type S3, S4 and S5 fill to inspector.

B. Soil Analysis: Submit for Type S3 and S4 soils to be imported.

C. Materials Source: Submit location of imported materials source. Provide materials from same source throughout the work. Change of source requires approval.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Soil Type S1: Excavated and re-used material, graded; free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

B. Soil Type S2: Excavated and reused material, graded; free of roots, lumps greater than one inch, rocks larger than 1/2 inch, debris, weeds and foreign matter.

C. Soil Type S3: Imported topsoil, friable loam; reasonably free of roots, rocks larger than ½ inch, debris, weeds, and foreign matter.

D. Soil Type S4: Imported borrow, suitable for purposes intended, meeting the following characteristics:
   1. Expansion Index (ASTM D4829): Less than 15
   2. Plastic Index: Less than 10
   3. R-Value (in paved areas): Minimum 40
   4. All imported fill material shall be submitted to the Soils Engineer for approval at least 48 hours prior to delivery at the site.
   5. Low Corrosion Potential:
      a. Soluble Sulfates: Less than 1,500 mg/Kg
      b. Soluble Chlorides: Less than 300 mg/Kg
      c. Soil Resistivity: Greater than 6,000 ohm-cm

E. Soil Type S5: Imported sand. Natural river or bank sand, washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

2.02 Source Quality Control

A. Inspection of imported soil will be performed by the Geotechnical Engineer, at source of import and prior to being delivered to the site.

PART 3 - EXECUTION

3.01 STOCKPILING

A. Stockpile excavated or imported material onsite at location designated by project inspector.

B. Stockpile excavated or imported material in sufficient quantities to meet project schedule and requirements.

3.02 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

B. Dispose of excess material off-site

END OF SECTION

SECTION 31 23 00

TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Excavating trenches, holes and pits for constructing the Work.
   2. Backfill and compaction.
   3. Providing suitable bedding and backfill material, as specified herein

B. Related Sections include the following:
   1. Contract General Conditions and Division 1, General Requirements.
   2. Section 31 11 00 – Site Clearing
   3. Section 31 20 00 – Earthwork: Excavation, Filling and Grading
   4. Section 31 22 22 – Soil Materials
   5. Section 33 11 16 – Site Water Distribution
   6. Section 33 31 13 – Sanitary Sewer
   7. Section 33 41 00 – Storm Drainage

C. References
   1. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

D. Definitions
   1. Utility: Any buried or above ground pipe, conduit, cable, associate devices or appurtenances, or substructure pertaining hereto.

1.02 QUALITY ASSURANCE

A. Qualifications
   1. Installer:
      a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this project within the past 5 years.

B. Regulatory Requirements:
   1. In accordance with Specification Section - REGULATORY REQUIREMENTS and the following:
      a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air

Resources Board [CARB] and the Environmental Protection Agency [EPA].

b. CF County of Fresno, Codes and Ordinances
c. EPA Environmental Protection Agency.
d. CAL/OSHA Comply with all provisions of the Construction Safety Orders and the General Safety Orders of the California Division of Occupational Safety and Health, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground excavations.

C. Certificates
1. Installer's certification that all trench backfill installation meets or exceeds the requirements of this specification.
2. Contractor's certification (on Contractor's letterhead paper) that the trench backfill materials and installation meets or exceeds the requirements of this specification.

D. Meetings
1. Pre-Installation: Schedule prior to the start of work.
a. Coordinate the work with other work being performed.
b. Identify any potential problems, which may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
2. Progress: Scheduled by the Contractor during the performance of the work.
a. Review for proper installation of work progress.
b. Identify any installation problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
a. Inspect and identify any problems which may impede issuance of warranties or guaranties.
4. Maintain installed work until the Notice of Substantial Completion has been filed.

1.03 COORDINATION

A. Coordinate work with Owner's personnel.

B. Verify that the location of existing utilities have been indicated at work site by utility authorities.

1.04 EXISTING UTILITIES

A. Where subsurface work involves more than the normal depth of excavation required for the removal and/or construction of surface improvements (surface improvements such as concrete work, paving, landscaping, signs, etc.), the Engineer will have made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

B. Under circumstance similar to 31 23 00/1.04A, service laterals and appurtenances will have also been shown where information was available as to their location. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

C. Determine exact location of existing buried utilities by:
   1. Marking on ground or pavement surface the alignment and extent of the proposed facilities and the probable location of existing utilities using construction plans and existing surface features.
   2. Requesting Underground Service Alert (USA) to indicate location of existing buried facilities (phone 1-800-227-2608). Provide USA a minimum of two (2) working days notice of request for locations, and notify Owner of said request concurrently.
   3. Locate exact location of existing utilities by hand methods of excavation, or by use of vacuum equipment.

D. At proposed work location, expose by hand methods (or vacuum equipment) all existing utilities along the route of the proposed work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand (or vacuum equipment) methods to locate all existing facilities as indicated on the plans, and/or as indicated on the ground by USA or Owner's personnel.

E. Provide Field Engineering per Contract General Conditions and Division 1 to record the location of all utilities encountered. Where locational conflicts exist between existing utilities and the planned location of facilities to be constructed under the Contract, submit detailed information to the Owner's Inspector and Engineer for review and direction.

F. Maintain all existing utility mains and service lines in constant service during construction of the Work.

G. Where service disruptions are allowed, minimize the length of such disruptions by proper scheduling and diligent pursuit of the work.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Fill Type S1, S2, S4 and S5, as specified in Section 31 22 22.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.

B. Protect existing structures, fences, sidewalks, curbs, and other improvements from excavation equipment and vehicular traffic.

C. Maintain and protect above and below grade utilities which are to remain.

D. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.

3.02 EXCAVATION

A. Excavate soil required to locate existing utilities and install the work.

B. Use hand methods of excavation to locate existing utilities, and to excavate trenches, pits and holes in congested areas.

C. Employ equipment and methods appropriate to the work site. Small mechanical excavators may be used only in areas where there is sufficient space so as not to damage adjacent improvements, and where the locations of all existing utilities have been determined by hand methods of excavating.

D. Cut trenches just wide enough to enable installation and proper bedding and backfill, and to allow inspection.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose material.

G. Excavate trenches, pits or holes bottoming in hardpan to a minimum of 6 inches below the grade for the bottom of the pipe and any couplings, and then backfill to the pipe grade with Type S2, S4 or S5 material, thoroughly compacted. No additional payment will be made for such over-excavation and refill.

H. In all trenches or excavation sites where a firm foundation is not encountered, such as soft, spongy, or otherwise unsuitable material, remove the material to a minimum of 12 inches, or to a depth determined by the Engineer, below the bottom of the proposed pipe or structure, and backfill the space with Type S2, S4 or S5 material containing sufficient moisture to produce maximum compaction. No additional payment will be made for such additional excavation or backfill.

I. Excavate trenches to provide the design grade of the facility, or as directed by the Engineer.

J. Stockpile excavated material to be returned to trench adjacent thereto in location which will not be detrimental to existing improvements, or pedestrian or vehicular traffic. Remove from site all unsuitable or excess material not to be used.

K. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw.

L. Remove excess soil not used as backfill from the work site. Obtain a disposal site off of the Owner's property and legally dispose of said excess material, all at no additional cost to the Owner.

M. If water is encountered during excavations, provide all dewatering measures necessary to construct improvements shown.

3.03 PROTECTION OF EXCAVATIONS

A. Provide all shoring and bracing as required and those codified in local, state and federal safety regulations.

B. Prevent water, caving or sloughing ground from entering excavations.

C. Maintain excavations free of water.

3.04 BACKFILLING

A. Provide pipe bedding as required by the plans and Sections 33 11 16, 33 31 13 and 33 41 00.

B. After installation of pipes and appurtenances and placement of pipe bedding material, backfill trenches and excavations to finish grade, or to the subgrade upon which replacement surface improvements are to be placed.

C. Backfill trenches above pipe bedding material and to within 24 inches of finish subgrade with Type S1, S2, S4 or S5 soils.

D. Employ a placement method that does not disturb or damage existing or proposed pipes or other Utilities or Improvements.

E. Place and compact all soil backfill in continuous layers not exceeding 6 inches in compacted thickness.

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

G. Backfill final 24 inch thickness to finish subgrade in areas to receive concrete, asphalt-concrete, aggregate base, or other non-vegetative surface improvement, with Type S2, S4 or S5 soils.

H. Backfill final 24 inch thickness to finish subgrade in areas to receive sod, other vegetation, or bare soil, with Type S2 or S3 soils.

I. Compact backfill below the top 24-inches to 90% relative compaction.

J. In areas to receive pavement, compact the top 24-inches to 95% relative compaction.

K. In planter or landscape areas, compact the top 24-inches to 85% relative compaction.

3.05 TOLERANCES

A. Top Surface of Backfill under Paved or Concrete Areas: Plus or minus 0.02 feet from required elevations.

B. Top Surface of General Backfilling: As required for finish surface to match adjacent improvements or ground.

3.06 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of General Conditions and Division 1.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.

C. If tests indicate work does not meet specified requirements, recompact, and retest. Retests required due to failure of initial tests shall be paid for by the Contractor.

3.07 PROGRESS AND PROSECUTION

A. Backfill any excavation opened in any day on that same day.

END OF SECTION

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SECTION 31 31 00

SOIL STERILIZATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Furnishing and installing soil sterilant under all new asphaltic-concrete pavement and crushed stone surfacing (DG).

B. Related Sections include the following:
   1. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading
   2. Section 31 23 00 – Trench Excavation and Backfill
   3. Section 32 11 26 – Aggregate Base Course

C. Related Documents
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work specified in this section.

1.02 SUBMITTALS

A. Submit in accordance with Specification Section Submittal Procedures 013300 - Contract General Conditions.

B. Certificates of application.

C. Certificates of compliance for material.

1.03 QUALITY ASSURANCE

A. Provide licensed operator to apply soil sterilant.

B. All products shall comply with the current EPA laws at time of application. Should the products listed become unavailable because of changes in the law, submit substitute products for review by the Owner.

1.04 STANDARDS

A. In accordance with the following:

CCR-T21	California Code of Regulations, Title 21 Public Works.
CBC	California Building Code, California Code of Regulations, Title 24, Part 2, CCR-T24.
USDA	United States Department of Agriculture.
EPA	Environmental Protection Agency.

All applicable Environmental Regulations and Standards.

1.05 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Soil Sterilant: Treflan, weed and grass preventer, or approved equal.

PART 3 - EXECUTION

3.01 Examination

A. Verify that site is ready for application.

3.02 Preparation

A. Identify installation locations.

B. Employ equipment and methods appropriate to the work site.

C. Provide vehicular and traffic controls per Division 01.

3.03 Application

A. Thoroughly water soak surface to be treated. Avoid excessive water runoff.

B. Apply sterilant solution over surface to receive pavement or surfacing prior to the start of pavement or surfacing installation.

C. Apply in spray form, at rate as allowable by State of California.

D. Take all precautions to limit soil sterilant solution to areas immediately under proposed pavement or surfacing. Use shields as necessary, and do not apply under windy conditions.

3.04 Field Quality Control

A. Field inspection will be performed under provisions of Division 01.

END OF SECTION

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SECTION 31 31 16

TERMITE CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Soil treatment with termiticide.

B. Related Sections include the following:
   1. Division 03 Section "Cast-in-Place Concrete" for building slabs and footings to receive treatment prior to placing vapor barrier and concrete.
   2. Division 06 Section "Rough Carpentry" for wood preservative treatment by pressure process.

1.02 PERFORMANCE REQUIREMENTS

A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

1.03 SUBMITTALS

A. Product Data: For termiticide.
   1. Include the EPA-Registered Label for termiticide products.

B. Product Certificates: For termite control products, signed by product manufacturer.

C. Qualification Data: For Installer of termite control products.

D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
   1. Date and time of application.
   2. Moisture content of soil before application.
   3. Brand name and manufacturer of termiticide.
   4. Quantity of undiluted termiticide used.
   5. Dilutions, methods, volumes, and rates of application used.
   6. Areas of application.
   7. Water source for application.

E. Warranty: Special warranty specified in this Section.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

C. Source Limitations: Obtain termite control products through one source.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

1.06 COORDINATION

A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.07 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
   1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Termiticides:
      a. Bayer Corporation; Premise 75.
      b. Dow AgroSciences LLC; Dursban TC.

2.02 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.
   1. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
   1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.03 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.04 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
   1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before vapor barriers, concrete footings and slabs are placed.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION

SECTION 32 01 90

LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.01 Maintenance and Period and Plant Establishment Period:

A. The contractual maintenance Period shall be for _____ calendar days. Landscape Contractor shall request a Final Inspection of the work at the time of completion. Maintenance shall begin at a mutually accepted date between the Landscape Contractor and Owner's Representative after all work has been accepted.

B. All the portions of this agreement notwithstanding, it is agreed that the intent of the maintenance contract is to provide a level of maintenance that will present a pleasing and desirable appearance at all times. The Landscape Architect and Owner shall be the sole judges in accepting the maintenance.

1.02 Related work specified elsewhere:

A.	Irrigation System	Section 32 84 00
B.	Lawn (Sod)	Section 32 92 23
C.	Ground Cover	Section 32 93 13
D.	Trees and Shrubs	Section 32 93 00

PART 2 - SCOPE OF MAINTENANCE

2.01 Areas to maintain:

A. The Contractor shall maintain all lawn, tree, shrub and ground cover areas.

2.02 Irrigation:

A. Irrigate as required to maintain a good reasonable appearance.

2.03 Fertilizer:

A. Fertilize all planted areas as to time of year and manufacturer's recommendations so as to maintain all plantings in a healthy and vigorous growing condition.

2.04 Weed and Pest Control:

A. Control pests and diseases, including rodents and snails as needed.

B. Maintain slopes and open areas to be weed free.

C. Trim and edge to maintain sidewalks and curbs free of plant growth.

D. Concrete drain channels to be kept free of debris to allow unobstructed water flow.

PART 3 - MAINTENANCE OF TURFGRASS AREAS

3.01 General:

A. The Contractor shall mow all lawn areas weekly, or as needed to maintain the height specified below. The borders shall be neatly edged. Trim around planters. Remove and dispose of all cuttings. Mow to the following heights:

Bermuda	1"
Bluegrass and Fescues	1 ¾" (October thru May)
	2 ½"- 3" (June thru September)

B. Irrigate as necessary to maintain proper growth rate and optimum appearance.

C. Maintain lawn areas in a weed-free condition.

3.02 Weed Control:

A. A pre-emergent crabgrass control shall be applied to all bluegrass turf between February 15 and April 15 of each year, as recommended by Weed Control Advisor.

B. Chemical control of broadleaf weeds shall be applied on an as needed basis to maintain a "weed free" turf condition.

3.03 Fertilization:

A. Fertilize turf areas at a rate of one pound of actual nitrogen per 1,000 sq. ft. during growing season and/or as needed to keep lawn in a healthy and vigorous growing condition.

PART 4 - MAINTENANCE OF SHRUB AND GROUND COVER AREAS

4.01 General:

A. The Contractor shall control pests and diseases, including rodents and snails as needed.

B. Weed control shall be by use of selective systemic herbicides and hoeing shall be initiated as necessary to maintain a weed-free condition.

C. Trim and edge ground cover areas as necessary to restrict growth rate and reasonable appearance. Prune shrubs under the supervision of Landscape Architect.

D. All of the above maintenance programs covered in this section shall apply to annual bedding plants and ground cover areas

PART 5 - MAINTENANCE OF TREES

5.01 General:

A. The Contractor shall control pests and diseases, rodents and workers with weed eaters.

B. Remove damaged branches back to point of break.

C. Restake and support trees when necessary, stakes and ties to be placed so no chaffing of bark occurs.

D. All guys and ties shall be checked frequently to avoid girdling.

E. Irrigate as required to maintain adequate growth rate and appearance.

F. Prune trees under the supervision of Landscape Architect.

PART 6 - MAINTENANCE OF IRRIGATION SYSTEM

6.01 General:

A. The Contractor shall maintain the complete sprinkler irrigation system in an operable condition.

B. The Contractor shall repair and adjust all sprinkler heads to maintain coverage including adjusting of heads to proper heights.

C. Contractor shall adjust water application to compensate for changes in weather.

D. Contractor shall be responsible for damages occurring due to under-watering or over-watering.

E. All replacements to be with original type material or substitutes approved by the Landscape Architect.

F. Repair or replacement of equipment damaged as a result of Contractor's negligence shall be replaced at the Contract's expenses within one watering period.

G. Damage not resulting from Contractor's negligence will be reported promptly to the Landscape Architect, together with an estimate of costs for correction of the condition.

H. All systems shall be operationally checked by the Contractor a minimum of once a week.

I. Irrigation shall be scheduled between 2:00 am and 7:00 am. Irrigation at other times shall be subject to approval of the Landscape Architect.

PART 7 - GENERAL MAINTENANCE

7.01 General:

A. Vegetation, either new or previously existing, shall be pruned or trimmed to prevent overhanging sidewalks at less than 7 feet in height or at roadways at less than 4 feet in height.

B. All operations shall be conducted so as to provide maximum safety for the public.

C. Where contact work may create potential of known hazards on streets or roads and to warn persons traveling close by, Contractor shall obtain, at his own expense, place whatever signs, lights, barricades and other safety devices that are necessary to prevent accidents, injuries or damages, consistent with applicable ordinances and statutes.

D. Leaves, paper, weeds and other debris shall be removed from landscaped areas and disposed of off the site by the Contractor.

E. Contactor shall clean sidewalks, roadways and any other areas dirtied by his maintenance operations.

F. Notification of all "specialty type" maintenance operations shall be given to the Owner's Representative 48 hours prior to each of these operations by the Contractor. "Specialty type" maintenance operations are defined as fertilization, pre-emergent weed control, turf aeration, turf dethatching, preventative applications of turf fungicide, and annual type bedding plant replacement.

G. Contractor shall, as part of this agreement, furnish all materials necessary to accomplish maintenance in accordance with the foregoing specifications. Contractor will be reimbursed the wholesale cost for vandalized materials and parts upon presentation of properly itemized list of damaged material and/or equipment.

H. Contractor shall maintain a phone service during normal working hours. If telephone answering service is utilized, the answering service shall be capable of contacting the Contractor by radio or pager. Contractor is further required to provide Owner with an emergency number for contact outside normal working hours.

N. Whenever herbicides are used, the Contractor shall apply when air currents are still, to prevent any toxic exposure to persons whether or not they are in or on the grounds.

J. Contractor shall prune plant materials so that all traffic control signs are clearly visible to approaching drivers.

K. Contractor shall complete and maintain "as built drawings" of all irrigation systems to include location and serial numbers of major components and turn them over to the Owner on termination of agreement.

L. Contractor shall request a Final Inspection by the Landscape Architect at the completion of Maintenance Period.

M. Extra work may be required by the Owner as a result of Acts of God, vandalism, theft, civil disturbance or accidents.

N. Extra work may be required by the Owner in order to add new landscaping or to delete or modify existing landscaping.

END OF SECTION

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SECTION 32 11 26

AGGREGATE BASE COURSE

PART 1 - GENERAL

1. SECTION INCLUDES

   A. Furnishing, spreading and compacting aggregate base course.

2. RELATED SECTIONS:

   A. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading.

   B. Section 31 23 00 – Trench Excavation and Backfill.

   C. Section 31 31 00 – Soil Sterilization.

   D. Section 32 12 16 – Asphalt Paving.

   E. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

3. REFERENCES

   A. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials.

4. QUALITY ASSURANCE

   A. Furnish aggregate materials conforming with SSCDOT.

   B. Perform work in accordance with SSCDOT.

5. SUBMITTALS

   A. Submit under provisions of Division 1 – General Requirements.

   B. Certificates of compliance for material.

   C. Load tags for delivered material.

6. COORDINATION

A. Coordinate with other work, including subgrade preparation and soil sterilization.

PART 2 - PRODUCTS

1. MATERIALS

A. Aggregate Base: Class 2, 3/4 Inch Maximum per Section 26 of SSCDOT.

PART 3 - EXECUTION

1. EXAMINATION

A. Verify quantities required.

B. Verify that subgrade has been compacted to minimum of 95 percent relative compaction and is dry.

C. Verify gradients and elevations of subgrade are correct.

2. SUBBASE

A. Per Sections 31 20 00 and 32 11 26 - Unless shown otherwise on the plans, compacted soil subgrade forms the base construction for work of this Section.

3. INSTALLATION OF AGGREGATE BASE COURSE

A. Install in conformance with SSCDOT Section 26, Aggregate Bases and Section 32 11 26.

B. Thickness - As shown on construction drawings.

C. Spreading and Compacting - In accordance with Section 26, SSCDOT. The relative compaction of each layer of compacted base material shall be not less than 95 percent.

D. The completed surface shall be thoroughly compacted, free from ruts, depressions, and irregularities and to be true to grade and cross-section, and shall conform to Section 26, SSCDOT.

4. TOLERANCES

A. Compacted thickness of aggregate base: No less than specified.

B. Finished Surface: Within 0.02 foot of planned grade per Section 26, SSCDOT. No more than 50% of the finish surface shall be above or below the specific grade for aggregate base.

5. FIELD QUALITY CONTROL

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

6. PROTECTION

A. Immediately after placement and compaction, protect surface from mechanical injury.

B. Protect completed surface until surfacing layers are in place.

END OF SECTION

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SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Asphaltic-concrete paving.
   2. Seal Coat.

B. Related Sections include the following:
   1. Section 31 22 00 - Earthwork: Excavation, Filling, and Grading
   2. Section 31 23 00 - Trench Excavation and Backfill.
   3. Section 31 31 00 - Soil Sterilization.
   4. Section 32 11 26 - Aggregate Base Course.
   5. Section 32 17 23 - Pavement Markings.
   6. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

C. References
   1. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials.

1.02 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Certificates of compliance for material.

C. Load tags for delivered material.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with SSCDOT.

B. Mixing Plant: Conform to SSCDOT.

C. Installation Criteria: Asphalt concrete shall show no evidence of cracking, uneven settlement, improper drainage, or untoward junctions with adjoining or

existing surfaces. Work displaying such conditions shall be corrected under the Contractor's guarantee of all work.

1.04 COORDINATION

A. Coordinate with other work, including subgrade preparation and soil sterilization.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt-concrete when atmosphere temperature is less than 50 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials
1. Paint Binder: In accordance with SSCDOT Section 94, Asphaltic Emulsions.
2. Asphalt-Concrete: Type B in accordance with Section 39, SSCDOT, ½ inch and ¾ maximum aggregate (medium) as shown on plans. The asphaltic concrete should be compacted to an average relative compaction of 97 percent, with no single test value being below a relative compaction of 95 percent based on a 50 blow Marshall maximum density. Use asphalt binder performance grade PG 64-10.
3. Seal Coat: Asphalt based seal coat shall be "Guardtop" as manufactured by Western Emulsions Inc, Monarch Beach, California, or approved equal, in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify quantities required. New asphalt-concrete paving is required at all locations shown on the plans, and where existing asphalt-concrete paving to remain is removed or damaged by the Project excavation or related work.

B. Verify that subgrade has been compacted to required relative compaction and is dry.

C. Verify gradients and elevations of base are correct.

D. Verify that subgrade has been sterilized per 31 31 00.

3.02 AGGREGATE BASE

A. Where shown on the construction plans, place and compact aggregate base course per Section 32 11 26.

B. Where shown on the construction plans, place asphalt on compacted earth subgrade per Section 31 20 00 and 31 23 00.

C. A soil sterilant shall be applied over the entire area which is to be paved.

3.03 PREPARATION – PAINT BINDER

A. Apply paint binder to existing asphalt-concrete or concrete surfaces which will be in contact with asphalt-concrete surfacing.

B. Rate of application for all surfaces against which asphalt concrete is to be placed shall be no less than 0.02 and no more than 0.05 gallons per square yard. All vertical concrete surfaces which will be in contact with asphalt concrete surfacing and all areas now in place which will be covered with new surfacing materials and feathering operations shall be coated with a paint binder applied at the rate of 0.05 gallons per square yard.

3.04 INSTALLATION OF ASPHALTIC-CONCRETE

A. Install in conformance with SSCDOT Section 39, Asphalt-Concrete.

B. Thickness - As shown on construction plans. Where thickness exceeds 2 inches, place in no less than 2 layers with top layer no thicker than one inch. Asphaltic concrete shall be laid to the thickness designated on the Plans. The plan thickness is to be considered as a minimum thickness. The Contractor shall lay the asphaltic concrete to a depth required to insure that, after compaction, the in place compacted thickness is equal to or greater than the specified plan thickness.

C. The Contractor shall provide to the Engineer the truck delivery weight tags for the asphaltic concrete material. The quantity delivered shall be equal to or greater than the calculated in place quantity based on the specified thickness and area to be paved as designated on the construction plans and based on a unit density of the asphaltic concrete of 141 pounds per cubic feet.

D. Asphalt type: PG 64-10

E. Compaction Equipment - In accordance with Section 39, SSCDOT. At small difficult areas, equipment may be altered as approved by Engineer.

F. The completed surface shall be thoroughly compacted, free from ruts, depressions, and irregularities and to be true to grade and cross-section.

3.05 INSTALLATION OF SEAL COAT

A. Immediately prior to applying the sealer, the surface shall be cleaned of all loose material which might adversely affect bonding of the sealer. Any standard cleaning method such as power sweepers and blowers may be employed.

B. Where cracks exceed 1/2 inch in depth of 1/4 inch in width, or both, they shall be thoroughly cleaned and repaired with asphalt crack filler material before placing the sealer. All cracks between 1/8" and 1/4" in width shall be filled with "Guardtop Crackfiller", as manufactured by Western Emulsions Inc, Monarch Beach, California, or approved equal, in accordance with the manufacturer's recommendations.

C. Whether or not specifically indicated on the plans, all potholes and badly distorted or depressed areas, except those lying within areas designated for pavement removal and replacement, shall be properly cleaned and repaired by applying a binder coat and hot mix asphalt concrete patch conforming to the requirements of Section 39, SSCDOT, before placing the seal coat.

D. A prime coat of SS-1 asphalt emulsion diluted with water, to 5 parts water to 1 part asphaltic emulsion, shall be applied to all existing (not new) pavement surfaces at a rate of application of 0.05 to 0.10 gallon of diluted primer per square yard.

E. Following the prime coat, two coats of asphalt based seal coat shall be applied. The first coat shall have added to it a silica sand mineral filler, which has passed a 50-mesh screen, at a rate of 2 to 3 pounds per 1 gallon of concentrated sealer. When the first coat is dry enough to walk on without picking the material up, a second coat shall be applied without mineral filler. If the manufacturer indicates that the product may be diluted, it may be diluted with no more than 20 percent by volume clean fresh water with the prior approval of the Engineer. The total application rate shall be a minimum of 35 to 45 gallons of undiluted product per 1,000 square feet, as directed by the Engineer. The finished surface shall be smooth and uniform in appearance. If existing depressions are such that aggregate still protrudes after the second coat of asphalt based sealer has been applied, the Contractor shall apply a third coat when so directed by the Engineer.

1. Seal Coat (for new pavement) - a minimum of 20 gallons of undiluted product per 1,000 square feet, as directed by the Engineer.
2. Seal Coat (for existing pavement) - 35 to 40 gallons of undiluted product per 1,000 square feet, as directed by the Engineer.

F. Allow asphalt-concrete to cure 21 days minimum prior to sealing.

G. Broom clean asphalt-concrete prior to sealing.

H. Protect sealed surface until it is cured.

3.06 TOLERANCES – GENERAL

A. Flatness: Maximum variation of 1/4 inch measured with 12-foot straight edge.

B. Scheduled Compacted Thickness: No less than specified.

3.07 FIELD QUALITY CONTROL

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

B. Pavement shall comply with the following:
1. Water shall not be able to accumulate at any point and the surface shall be free to drain to drainage inlets.
2. The paving contractor shall water flood the surface with the use of a water truck. If, after 30 minutes on a 70 degree F day, “bird baths” are evident in a depth more than 0.01 foot, the paving contractor and the Owner’s representative will determine the best method of correction.
3. A string line and a 10 foot straightedge shall be used to check for high spots and ridges. High spots and ridges out of compliance shall be reduced by a remedy determined by the paving contractor and the Owner’s representative.

C. Should a section of the work be not acceptable on the basis of inadequate compaction and/or the mixture becomes loose and broken, mixed with dirt, out of tolerance, or in any other way defective, it shall be repaired or removed and replaced with fresh mixture and immediately compacted to conform to the surrounding area to the satisfaction of the Owner.

3.08 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury.

B. Allow asphalt-concrete to cure 21 days minimum prior to placement of seal coat.

C. Broom clean asphalt-concrete prior to sealing.

D. Protect sealed surface until it is cured.

END OF SECTION

SECTION 32 13 13

SITE CONCRETE IMPROVEMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely install exterior Portland cement flatwork cast-in-place concrete and architectural flatwork concrete, accessories and other related items, slabs, ramps and sidewalks and walkways, curb and gutter, mowstrips, and other miscellaneous concrete items of the form and dimensions shown on the plans and necessary to complete the project, and in accordance with the requirements of the Standard Specifications as modified and supplemented by these Special Provisions
   2. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

B. Related Sections include the following:
   1. Section 03 11 01 – Concrete Formwork.
   2. Section 32 13 15 – Reinforcement
   3. Section 03 30 00 – Cast-in-Place Concrete
   4. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading

C. References
   1. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials.
   2. ACI standards, including but not limited to #304, 305, 306, 308, 309 and 347.
   3. ASTM standards, including but not limited to #C-33, C-39, C-94, C-136, C-143, C-150, and C-309.

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00.
   1. Certificates of compliance for materials and mix designs.
   2. Load tags for delivered material.
   3. Strength testing as required by the approving agency.
   4. Integral color sample.
   5. Application instructions for the architectural finish materials.

6. Accessories and manufacturer's installation specifications.

1.03 QUALITY ASSURANCE

A. Furnish concrete materials conforming with SSCDOT.

B. Perform work in accordance with SSCDOT, unless noted otherwise herein.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Class 3 concrete shall be 5 ½ sack conforming to the requirements of Section 90 of the Standard Specifications, and shall have a minimum compressive strength of 2,800 psi at 28 days. Class 2 concrete shall be conforming to the requirements of Section 90 of the Standard Specifications, and shall have a minimum compressive strength of 3,500 psi at 28 days. Portland cement shall be Type II Modified and aggregate gradation shall conform to the requirements of Subsection 90-3.4 for 1-inch maximum grading.

B. Reinforcement shall comply with relevant portions of Section 03 20 00.

C. Formwork shall comply with relevant portions of Section 03 11 01.

D. Stair nosing: 2" x ½" mill finish aluminum nosing by Balco, Inc. or approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

A. Subgrade shall conform to the requirements of Earthwork: Section 31 20 00. The District may elect to verify compacted subgrade elevations by measurement made from adjacent existing improvements or by a template supported by forms.

3.02 GENERAL CONCRETE

A. Concrete placement shall conform to the applicable requirements of Section 51 of the Standard Specifications. Concrete shall not be placed when the air

temperature in the shade at the project site exceeds 95º F or is below 45º F, or when the temperature of the concrete exceeds 85º F.

B. After the concrete has been placed, it shall be struck off to proper section and compacted with a grid of parallel metal bars until a layer of mortar not less than 3/8 inch thick has been brought to the surface. All exposed concrete surfaces shall receive a medium broom finish applied transversely to the line of pedestrian traffic or to the longest dimension of the concrete, as applicable.

C. General concrete surfaces shall be cured by the curing compound method and shall be protected in accordance with the provisions of Subsections 90-7 and 90-8 of the Standard Specifications.

3.03 PROTECTION OF CONCRETE

A. The Contractor shall be responsible for the condition of all concrete work until such time as all work has been completed and is accepted by the District. The Contractor shall limit vehicular travel across concrete until such time as the concrete has achieved strength sufficient that it can support traffic without damage. In no case, however, will vehicles be allowed to travel across new concrete improvements until seven calendar days have passed since the concrete was placed.

3.04 CONCRETE JOINTS

A. Expansion joints and weakened plane joints shall be constructed at the locations shown on the plans or as directed by the Engineer. Where joint locations are not specified on the plans, expansion joints shall be constructed at maximum intervals of 45 feet, and weakened plane joints shall be constructed at maximum intervals of 15 feet.

B. Expansion joints shall be considered as weakened plane joints for the purpose of spacing weakened plane joints. Expansion joints shall be tooled with a ½ inch maximum radius edger, and shall be filled with ½ inch pre-formed expansion joint filler.

3.05 INSTALLATION OF ACCESSORIES

A. Strictly comply with manufacturer's instructions and recommendations and approved details. Securely anchor work to substrate.

3.06 REPAIR AND CLEAN-UP

A. Contractor shall legally remove all trash, debris, containers and excess materials from the site on a periodic basis, and shall keep the work broom clean until Owner's acceptance.

B. The Contractor shall be held responsible for the repair and/or replacement of new or existing improvements damaged as a result of this work to the satisfaction of the Owner.

C. The Contractor shall provide roll-off bins for wash-out of ready mix concrete trucks and pumpers. Do not allow concrete debris or cement water onto soils scheduled for landscape planting.

END OF SECTION

SECTION 32 13 15

CONCRETE REINFORCEMENT

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. This Section includes the following:
   1. Concrete reinforcement

B. RELATED SECTIONS
   1. Section 32 13 13 - Site Concrete Improvements.

1.3 SUBMITTALS

A. Submit in accordance with Specification Section SUBMITTALS and the Contract General Conditions.

   1. Mill test certificates identifying chemical and physical analysis of each load of reinforcing steel delivered. If mill test reports are not available and the quantity of steel for a structure exceeds 5 tons, provide a laboratory test to prove yield strength and bending.
   2. Drawings and placing diagrams for each grade slab including dowels and corner bars.
   3. On the placing diagrams, show all openings for pipelines and architectural features. Include additional reinforcing at openings and corner bar arrangements at intersecting beams, walls, and footings.
   4. Coordinate placing diagrams with the concrete placing schedule.

1.4 PRODUCT DELIVERY

A. Deliver reinforcement to project site in bundles marked with tags indicating bar size and length.

B. Store on wooden supports above ground surface.

PART 2 - PRODUCTS

2.1 BARS

A. Bars shall be deformed billet steel conforming to ASTM A 615, Grade 60. Mixing of steel grades will not be allowed.

2.2 BAR SUPPORTS

A. Bar support shall be concrete or metal chairs, spacers or hangers. Reinforcing bars shall not be supported by forms.

2.3 TIE WIRE

A. Tie wire shall be annealed steel wire of not less than 16-gauge.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Position reinforcement in accordance with the drawings, secure with wire ties or suitable clips at all intersections, and support by an adequate number of concrete or metal chairs, spacers, or metal hangers such that reinforcing bars do not sag more than one quarter of an inch (1/4") between supports. Do not place reinforcement or supports in contact with the forms. Bend tie wires away from the forms in order to provide the specified concrete coverage. To secure reinforcement in position, the Contractor may elect to locate bars additional to those shown on the drawings, but at no additional cost to the Owner.

B. Set reinforcing dowels and anchor bolts in place prior to placing concrete. Do not press them into the concrete after the concrete has been placed.

3.2 SPLICES

A. Splice bars only at locations shown on the drawings. Where splices are not detailed, lap bars 36 bar diameters and 18 inches minimum and stagger adjacent splices 48 bar diameters.

3.3 CLEANING

A. Remove dirt, form oil, excessive rust, cement coating from previous pours, and foreign matter that will reduce bond with concrete.

3.4 PROTECTION DURING CONCRETING

A. Keep reinforcing steel in proper position during concrete placement.

END OF SECTION

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SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Furnishing and installing paint parking stall, traffic marking and wording on asphalt-concrete surfaces.
   2. Furnishing and installing disabled marking and hatching area on asphalt-concrete pavement.

B. Related Sections include the following:
   1. Section 32 12 16 – Asphalt Paving.
   2. Section 32 13 13 – Site Concrete Improvements.
   3. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

C. References
   1. SSCDOT - Standard Specifications, California Department of Transportation (Caltrans), latest edition, except for references to methods of payment and to furnishing of materials by State.

1.02 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Certificates of compliance for materials.

1.03 COORDINATION

A. Coordinate work with other work, including associated traffic signing.

B. Commence striping or marking of asphalt-concrete no sooner than 7 days following any sealing of the asphalt-concrete.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Paint: Quick drying, high visibility water soluble acrylic striping paint; Stripe Master, Wikel Mfg. Company, or similar by Sherwin-Williams, J.E. Bauer, or PPG, or approved equal.

B. Paint shall be of color indicated on the construction plans.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that site is ready for application.

3.02 PREPARATION

A. Identify installation locations. Place parking stall striping, traffic marking, wording, disabled symbol and access striping at locations, as shown on construction plans.

B. Thoroughly clean all surfaces to be painted.

C. Employ equipment and methods appropriate to the work site.

D. Provide vehicular and traffic controls per Section 01 50 00.

3.03 INSTALLATION

A. Apply paint striping and marking as indicated on the plans.

B. Apply paint uniformly, straight and true, with equipment designed for traffic striping and marking applications.

C. Apply paint striping and marking per Section 84 of SSCDOT, except supply paint conforming to 2.01 of this specification.

D. Apply a minimum of 2 separate coats of paint at all striping and marking locations, including asphalt-concrete and concrete surfaces.

E. Paint traffic control arrow per detail drawings.

F. Paint wording on pavement with elongated letters 3 feet high using approved standard stencils as shown on the plans.

G. Paint international symbol of accessibility at the location as shown on the plans.

H. Paint accessible access area striping at the location as shown on the plans.

3.03 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Division 01.

END OF SECTION

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SECTION 32 28 52

PARKING LOT FURNITURE

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Furnish and install signs, posts and concrete wheelstops

B. Related Sections include the following:
   1. Division 00 – Contract Requirements.
   2. Division 01 - General Requirements.
   3. Section 32 12 16 – Asphalt Paving
   4. Section 32 13 13 – Site Concrete Improvements.
   5. Drawings and general provisions of Contract

C. References
   1. SSCDOT - Standard Specifications, California Department of Transportation (Caltrans), latest edition, except for references to methods of payment.
   2. CBC – California Building Code, latest edition.

1.02 SUBMITTALS

1. Submit under Section 01 33 00.

1.03 COORDINATION

1. Coordinate work with other work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Signs: As per detail drawing.

B. ADA Accessible Signs: As per detail drawing.

C. Sign Posts: 2-inch diameter galvanized iron pipe, A-120, Schedule 40, unless otherwise shown on drawing.

D. Concrete for Sign Footings: Per Section 32 13 13.

E. Wheelstop: As per detail drawing.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions

3.02 PREPARATION

A. Identify installation locations.

B. Locate, identify, and protect existing above and below grade utilities from damage.

C. Employ equipment and methods appropriate to the work site

3.03 INSTALLATION

A. Install all sign posts straight and plumb in concrete footings as shown on plans.

B. Secure all signs to posts with vandal resistant galvanized hardware furnished by the Contractor.

C. Orient direction of all signs as indicated on the plans.

D. Install concrete wheelstops at locations shown on drawings. Anchor each wheelstop with two rebars driven into the asphalt concrete pavement per detail drawing.

3.04 FIELD QUALITY CONTROL

A. Field inspection will be performed under Division 01.

END OF SECTION

SECTION 32 33 10

TACTILE/DETECTABLE WARNING SURFACE TILE

PART 1 - GENERAL

1.01 SUMMARY

A. Surface Applied tactile tile modules where indicated.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.

B. Samples for Verification Purposes: Submit two tile samples minimum, 6 inch by 8 inch of kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details; composite structural system; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.

D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated. All test reports shall be conducted on Surface Applied tactile tile system as certified by a qualified independent testing laboratory.

E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of tactile tile and accessory as required.

1.03 QUALITY ASSURANCE

A. Provide Surface Applied tactile tiles and accessories as produced by a single manufacturer.

B. Installer's Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

C. Americans with Disabilities Act (ADA): Provide tactile warning surfaces that comply with detectable warnings on walking surfaces section of Americans with Disabilities Act (Title 49 CFR TRANSPORTATION, Part 37.9 STANDARDS FOR

ACCESSIBLE TRANSPORTATION FACILITIES, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES.

D. California Code of Regulations (CCR): Provide only approved DSAAC detectable warning products as provided in the California Code of Regulations (CCR). Title 24, Part 1, Articles 2, 3 and 4 and Part 2, Section 202 definition of "Detectable Warning". Provide in accordance with Sections 11B-247.1 and 11B-705.1

E. Detectable Warning Texture: Division of the State Architect (DSN Access Compliance) approved products shall be used, compliance with CBC Section 11B-705.1, IRs 11B-2, 11B-3 and 11B-4 and the California Accessibility Reference Manual.
   1. Truncated Domes: provide raised Detectable Warnings with diameter of 0.9 inch at base tapering to 0.45 inch at top, height of 0.2 inch, with center-to-center spacing of 2.35 inches and corner domes spaced at 0.896 inch from the corner edges of tile. Provide raised truncated domes in a square grid (in-line) pattern.
      a. Truncated Dome: shall contrast visually with adjoining surfaces, light-on- dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.

1.04 DELIVERY, STORAGE AND HANDLING

A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

B. Tiles shall be delivered to location at building site for storage prior to installation.

1.05 SITE CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive tactile tiles for at least 48 hours prior to installations, during installation, and for not less than 48 hours after installation. Store tactile tile material in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 40°F in areas where work is completed.

B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the passengers or public. Provide barricades or screens to protect passengers or public.

C. Disposal of any liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.

D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on the site.

1.06 EXTRA STOCK

A. Deliver extra stock to storage area designated by engineer. Furnish new materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification for Surface Applied tactile tiles. Furnish not less than two (2) percent of the supplied materials for each type, color and pattern installed.

1.07 WARRANTY (DETECTABLE WARNINGS AND DIRECTIONAL TEXTURE)

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detectable warnings and directional surface products that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly.
      b. Degrade significantly means that product maintains at least 90 percent of its approved design characteristics, as determined by the authority having jurisdiction.
   2. Warranty Period: Five years from date of Final Completion.
   3. Authority: California Building Code Sections 11B-247.1 and 11B-705.1. Division of the State Architect Interpretation of Regulations (IR) 11B-2, 11B-3 11B-4.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
   1. Engineered Plastics Inc., Armor Tile.
   2. ADA Solutions, Inc., North Billerica, MA.

B. Detectable Warning Texture: Division of the State Architect (DSA/Access Compliance) approved products shall be used, compliance with CBC Sections

11B-247.1 and 11B-705.1, IRs 11B-2, 118-3 and 11B-4 and the California Accessibility Reference Manual.

1. Truncated Domes: provide raised Detectable Warnings with diameter of 0.9 inch at base tapering to 0.45 inch at top, height of 0.2 inch, with center-to-center spacing of 2.35 inches and corner domes spaced at 0.896 inch from the corner edges of tile; Provide raised truncated domes in a square grid (in-line) pattern.
   a. Truncated Dome: shall contrast visually with adjoining surfaces, light-on- dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.
2. Detectable Warning Texture (Truncated Domes): Plastics/Composites: Armor Tile, ADA Tactile Systems by Engineered Plastics Inc., North Billerica, or equal.

C. The Vitrified Polymer Composite (VPC) Surface Applied Tactile Tile specified is based on Armor-Tile manufactured by Engineered Plastics Inc. Existing engineered and field tested products which are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.

D. Color: Yellow conforming to Federal Color No. 33538. Color shall be homogeneous throughout the tile.

2.02 MATERIALS

A. Fasteners: Color matched, corrosion resistant, flat head drive anchor: W diameter x 1 3/4" long, or manufacturer's recommended fasteners.

B. Adhesive and Sealant: Manufacturer's standard.

PART 3 - EXECUTION

3.01 INSTALLATION

A. During all surface preparation and tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The application of all tile, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers.

C. Ensure that surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation. Review design drawings with the Contractor prior to the construction and refer any and all discrepancies to Engineer.

D. Set the tile true and square to the curb ramp area as detailed in the design drawings.

E. Immediately prior to installing the detectable warning surface tile, the wet concrete surfaces must be inspected to ensure that it is clean and free of debris.

F. Do not remove protective plastic covering on detectable warning tile product until tile is installed and concrete is fully cured.

G. Slowly press the detectable warning tile into the wet concrete until the base of the truncated domes is flush with the adjacent concrete. Do not stand on the tile during installation. Tap the detectable tile with a rubber mallet as required to ensure all edges are flush with concrete. Install anchors into wet concrete as specified per manufacturer's recommendation and ensure that the anchors are flushed with the detectable tile surface. Provide weight to the detectable tile surface if "floating" occurs after tile placement. All detectable tile edges shall be flush with adjacent concrete.

H. While the concrete is workable, a 1/8" deep troweled edge shall be installed around the tile perimeter. Finish the concrete as required per specifications. Ensure concrete edge do not have any low areas that collect water.

I. Set the tile true and square to the curb ramp area as detailed in the design drawings.

J. If installing adjacent tiles, note the orientation of each tile. Careful attention will reveal that one of the long edges of the tile is different than the other, in regard to the tiny dotted texture. You may also note a larger perimeter margin before the tiny dotted texture pattern begins. Consistent orientation of each Tile is required in order that the truncated domes on adjacent tiles line up with each other.

K. In order to maintain proper spacing between truncated domes on adjacent tiles, the tapered edge should be trimmed off using a continuous rim diamond blade in a circular saw or mini-grinder. The use of a straightedge to guide the cut is advisable. All cuts should be made prior to installation of the tiles.

L. Remove protective plastic sheeting after all post-installation treatments are complete and the concrete has cured.

3.02 CLEANING AND PROTECTING

A. Protect tiles against damage during construction period to comply with tactile tile manufacturer's specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean tactile tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean tactile tile by methods recommended by manufacturer.

END OF SECTION

SECTION 32 84 00

LANDSCAPE IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The work included under these specifications shall consist of the furnishing of all materials, sprinkler equipment and labor necessary for the complete installation of a sprinkler Irrigation System in accordance with the following Specifications and the Installation Plan. It is the intent of these specifications and drawings to form a guide for a complete installation. Therefore, any items not specifically noted, but reasonably necessary for a complete installation shall be furnished under this contract. The system shall efficiently and uniformly irrigate all areas and perform as required by these plans and specifications.

1.02 CODES AND PERMITS:

A. Materials and Installation shall conform to all State and Local Codes and Regulations governing the trades included in this work. Requirements of these plans or specifications not conforming therewith, but exceeding code requirements, shall govern. The CONTRACTOR shall obtain and pay for all necessary permits required for this work. He shall also arrange and pay for all costs in connection with inspections, examinations or approvals required by
governing ordinances thereof.

1.03 VERIFICATION OF PLANS AND SPECIFICATIONS;

A. It shall be the responsibility of ALL PARTIES concerned to carefully examine the plans and specifications relating to this work for completeness, accuracy, and clarity. Any conflict, errors or clarification requests shall be immediately brought to the attention of the OWNER'S Representative for written interpretation or instructions. No claim for increased compensation for additions, changes or alterations will be considered unless written authorization is granted by the OWNER'S Representative. Otherwise any additional changes necessary to meet existing conditions shall be furnished under this contract.

1.04 WORKING CONDITIONS:

A. It shall be the responsibility of ALL PARTIES concerned to visit the irrigation job site and fully inform themselves as to all existing conditions and/or limitations relating to this work. No claim for increased compensation shall be considered for changes or alterations due to visible or obvious conditions. Invisible or unknown conditions such as hidden rock, water, etc., encountered during progress of the work shall be considered an extra, and shall necessitate written confirmation of increased compensation by the OWNER before the work is continued.

B. The CONTRACTOR shall confine his operations, storage, and equipment to the areas allotted him by the OWNER for his work and materials.

C. The CONTRACTOR shall continuously maintain a competent superintendent, satisfactory to the OWNER, to direct the work in progress, with the authority to act for him in all matters pertaining to the work. The OWNER shall also designate his representative, with authority to act for similarly. All work shall progress as rapidly as possible and practical without unnecessary delays. Precautions necessary to provide reasonable safety for all persons, materials, and equipment involved in this work shall be followed.

D. All materials necessary to complete the installation shall be handled in such a manner as to Prevent damage and minimize waste. All losses or damage to materials, equipment or OWNER'S property while in the possession of, or being used by the CONTRACTOR, shall be the responsibility of the CONTRACTOR and he shall repair, replace, or otherwise compensate the OWNER for any such loss. The working area shall be kept clean of all debris, rock, waste or dirt. Cleanup and removal of all equipment, excess materials, etc., shall be completed before acceptance will be approved by the OWNER.

E. The CONTRACTOR shall not assign nor sublet any portion of this work without written Approval of the specific subcontractor by the OWNER.

F. Overtime work will be at the CONTRACTOR'S option and expense unless requested in writing by the OWNER, in which case the OWNER will pay an agreed overtime premium.

1.05 UTILITIES AND PROTECTION:

A. The CONTRACTOR shall be responsible for furnishing and installing all utilities necessary for operation of the herein-specified equipment. The OWNER shall make available to the CONTRACTOR all available information regarding the exact location of existing utilities. The CONTRACTOR shall be liable for damages to, or the cost of repairing and/or replacing buried conduit, cables or piping encountered during installation work.

1.06 TIME OF INSTALLATION:

A. The CONTRACTOR shall commence Work within five (5) calendar days of written notice to proceed, weather permitting. The installation shall be completed within the time allocated by the OWNER.

1.07 WORKMANSHIP:

A. The CONTRACTOR shall have had considerable experience and demonstrated ability in workmanship required, in a neat, orderly and reasonable manner, with recognized standards of the installation of sprinkler irrigation systems of this type. No work shall be completed without supervision. Skilled persons proficient in the trades shall install all work.

B. All underground work shall be inspected and approved by the persons supervising the installation for corrections and completeness before backfilling.

C. All materials and equipment shall be warranted in writing for a period of one year against defects in materials and workmanship from their respective manufacturers. All installation work shall be warranted for a period of one year against defective workmanship and handling by the installer. Warranties shall become effective on the day the system or any portion thereof, is accepted by the OWNER.

1.08 OPERATING INSTRUCTIONS:

A. An Operation and Instruction Manual shall be furnished to the OWNER upon final payment for the materials and work herein described. It shall include the complete technical description, complete operation, function, and performance; complete detailed servicing instructions and replacement parts list, and information regarding protection of the equipment. The manual shall also be equipped with record forms for collecting data during the initial break-in period and subsequent operation.

1.09 RECORD DRAWINGS:

A. The CONTRACTOR shall maintain at least one set of "Working Prints" for annotating all installation changes, or corrections to the Installation Plans. These shall be carefully recorded and kept up-to-date daily throughout the progress of the work to completion of the project, whereupon they shall be returned to the OWNER. (See Special Provisions Section of these Specifications.)

PART 2 - MATERIALS

2.01 EQUIPMENT TO BE INSTALLED:

A. All sprinkler Heads used in combination shall be compatible in performance. Bids shall be submitted on the basis of furnishing the materials exactly as specified. Other equipment may be furnished provided it is equal to, or better than the quality specified in all respects. Descriptive data and samples of all proposed substitutions or equipment shall be submitted to the OWNER for approval.

B. Acceptance or rejection of any such requests for substitutions shall be furnished to the bidders prior to the bid date. All materials and sprinkler equipment shall be new and unused.

2.02 MATERIALS AND SPRINKLER EQUIPMENT TO BE SPECIFIED:

A. All materials and equipment to be used on this job will be as specified on the equipment legend on the Installation Plan.

PART 3 - EXECUTION

3.01 INSTRUCTIONS:

A. Prior to commencing the installation work under these specifications, all members of the CONTRACTOR'S crew shall be informed by the OWNER'S Representative of all of the terms and conditions affecting their actions and work at the job site. Workers shall be knowledgeable in regards to the performance, operation, installation procedures, and handling of the materials and equipment they will be working with. All mechanical equipment operators shall be reminded of the hazards and safety precautions in regards to the equipment they will be using. The installation procedures shall be discussed and explained.

3.02 STAKING:

A. The location of all sprinklers, valves, piping and principal fittings shall be staked out by the CONTRACTOR'S Representative. All staking and measurements shall be taken from permanent objects, buildings, etc., or survey bench markers and not from objects such as turf boundaries, etc., which are subject to change. All measurements shall be made in feet and inches. Fractions may be rounded to the nearest inch. As the staking progresses, all additions, changes, or equipment locations, whether or not necessitating an increase or decrease in compensation, shall be noted on the copy of the "Working Plans" from which the "As-Builts" drawings will be made.

3.03 EXCAVATION:

A. The CONTRACTOR shall do all necessary excavation for the proper installation of his work. Mechanical trench diggers used on this site shall be of an approved type to cut smooth bottom trenches on uniform slopes. Trenches shall be no wider than is necessary to lay pipe, except that extra working space shall be provided where necessary to make joints. Boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth of six (6) inches below the trench bottom. Over-excavation shall be backfilled and carefully tamped to provide a smooth and firm-bearing surface for laying the pipe. Minimum depth of cover shall be at least twenty-four (24) inches for pressure main piping; and a minimum depth of twelve (12) inches for spray head lateral discharge piping or eighteen (18) for rotor sprinklers; or at a sufficient depth to accommodate valves and other equipment, whichever is greater. The CONTRACTOR shall barricade and/or light the excavated area to prevent undue hazard to the public.

3.04 PIPE FITTING AND ASSEMBLY:

A. All pipelines shall be installed in the locations shown shall be of the sizes indicated and the materials specified herein. Parallel piping shown on the drawings may be installed in the same trench. Piping shall be laid accurately to the line and grade required, with full bearing on the trench bottom. No pipe shall be laid on soft fill or other unstable materials. No direct contact between other pipes or structures will be

permitted at crossings. The interior of the pipe shall be clear of foreign matter during installation and shall be kept clean by means of plugged or capped ends after lowering into the trench. All work shall be performed in strict accordance with the manufacturer's installation instructions for the various types of pipe herein specified.

B. This shall include thrust-blocking, handling, storage, connections, cathode protection, coating, expansion allowance, testing, etc. All pipelines shall be flushed out thoroughly to remove all debris and foreign matter. All pipelines shall be inspected for leaks at the joints and fittings and repaired or replaced as required.

3.05 SPRINKLER AND QUICK COUPLING VALVES:

A. Sprinkler and Quick Coupling Valves shall be set plumb and level with established turf at the locations indicated on the plans.

B. In turf areas where grass has not yet been established, sprinklers shall be initially installed on Risers above grade level. When grass is established, the CONTRACTOR shall lower sprinkler heads to their permanent positions flush with the finished grade. This elevation is critical and care shall be taken to set them exactly at or slightly above finished grade...NEVER BELOW.

C. All Sprinklers and Quick Coupling Valves shall be installed on swing joint risers capable of remaining flexible to protect the piping and allow adjustment of the height to the turf grade. Sprinklers shall be spaced as indicated on the plans, and no spacing shall be greater than that recommended by the manufacturer for efficient water distribution.

3.06 VALVES:

A. All valves shall be connected directly to the main line in a plumb position with sufficient clearance for service and operation. Remote Control Valves shall be as centrally located among the sprinklers as practical, in accordance with the plans. The valves shall be adjusted for proper operation as required by the manufacturer for specified performance.

3.07 CONTROL WIRE:

A. Control wire shall be specifically designed for direct burial use. Sizes shall be in accordance with the minimums recommended by the controller manufacturer. A minimum loop of eighteen inches (18") shall be left at each valve, at each splice, at each change in direction, and at each controller for expansion and/or servicing. Wire shall be placed consistently along one side of the pipe in the trench. Splices and connections shall be watertight and leak proof. Wire shall be within a protective sleeve for bridge or water crossings, or where other conduits make it necessary.

3.08 AUTOMATIC CONTROLLERS:

A. Automatic Controllers shall be installed and mounted in a manner approved by the manufacturer. The OWNER for best visual observation and protection shall determine controller locations.

3.09 VALVE BOXES:

A. Each Remote Control Valve shall be installed in a valve box. The valve box shall be positioned over the valve so that all parts of the valve can be reached for service.

3.10 TESTING:

A. All piping shall be hydrostatically tested at not less than 150% of designed operating pressure for not less than one hour, to the satisfaction of the OWNER and a record kept of the conditions, leaks, repairs and the date(s) of such tests.

B. All sprinklers valves and controllers shall be tested for operation and performance with records kept of the results and date(s) of the test. All necessary adjustments to the sprinkler equipment as required shall be made to assure efficient operation. The system shall be operated through a complete cycle before turning it over to the OWNER for operation.

3.11 BACKFILLING:

As soon as the work has been installed inspected and approved, all excavation shall be filled with fine earth materials, free from clods, rocks or other unsuitable substances. Trenches must be left flush or slightly above, adjacent finished grade after compacting as closely as possible to the original density of the soil. Backfilling of trenches containing plastic pipe shall be performed when the pipe is cool to avoid excessive contraction in cold weather.

END OF SECTION

SECTION 32 91 13

SOIL PREPARATION

PART 1 - GENERAL

1.01 Work Included:

Preparation of soil for planting of lawn, shrub and ground cover areas.

1.02 Related Work Specified Elsewhere:

A.	Lawn (Sod)	Section – 32 92 23
B.	Ground Cover	Section – 32 93 13
C.	Trees and Shrubs	Section – 32 93 00

1.03 Certificates

A. In addition to any certificates specified, the Contractor shall furnish a certificate with each delivery of bulk material stating source, quantity and type of material and that material conforms to specification requirements. All certificates shall be delivered to the Owner's Representative at the time of each delivery. All bulk delivered loads shall be delivered with level load volume plainly marked on truck bed.

PART 2 - MATERIALS

2.01 Samples:

A, Samples of materials listed below shall be submitted to the Owner's Representative for inspection and approval. Affidavits shall accompany each sample stating the samples conform to the following specifications. Samples shall be stored in a secure place on the project site.

2.02 Nitrolized Fir: 1/4-inch maximum size with 1% nitrogen added.

Gypsum: Agricultural Grade

Commercial Fertilizer: Shall contain a minimum of 10% total nitrogen, 10% available Phosphorous and 20% soluble potash.

Top Dressing: Shall be Shredded Fir Bark 2" in Depth.

PART 3 - EXECUTION

3.01 Installation:

A. All planting areas shall first be chiseled to a depth of 12 inches and all rock, debris and Miscellaneous foreign matter removed.

3.02 Lawn Areas:

A. All lawn areas shall be thoroughly cultivated to a depth of not less than six (6) inches. Into this cultivated area spread evenly four (4) cu. Yds. Of Nitrolized Fir per 1,000 sq. ft., one (1) ton of gypsum and four (4) hundred pounds of Commercial Fertilizer per acre to these areas and
rototill in to a depth of 6 inches.

3.02 Ground Cover Areas:

A. All ground cover areas shall be thoroughly cultivated to a depth of not less than six (6) inches. Spread evenly four (4) cu. Yds. Per 1,000 sq. ft. of Nitrolized Fir, one (1) ton of gypsum and four (4) hundred pounds of Commercial Fertilizer per acre to these areas and rototill in to a depth of six 6) inches. After shrubs, trees and ground cover have been planted, two (2) inches of Shredded Fir Bark shall be placed over all areas as a top dressing. Any pre-emergence required shall be applied prior to the application of the top dressing.

3.03 Delivery and Shipping Tags

A. All delivery and shipping tags shall be retained and given to the Owner's Representative as proof of proper amounts used for the requirements of all the above Section 02900.

END OF SECTION

SECTION 32 92 23

LAWN (SOD)

PART 1 - GENERAL

1.01 Work Included:

A. Installation of Turf

1.02 Related Work Specified Elsewhere.

A. Soil Preparation – Section 32 91 13
B. Landscape Maintenance – Section 32 01 90

PART 2 - MATERIALS

2.01 Lawn Seed Mixture

A. Lawn seed used shall be fresh "Blue Tag Certified" clean crop seed. Turf-type shall be a Dwarf Fescue Mix adaptable to location and climatic conditions of the area.

PART 3 - EXECUTION

3.01 Pre-water

A. Pre-water all turf areas thoroughly for one (1) week or as directed by the Owner's representative to germinate weed seeds.

3.02 Weed Control

A. Weed Control shall be applied by a licensed Pest Control Operator (PCO) as recommended by a licensed Pest Control Advisor (PCA).

3.03 Planting

A. Plant sod as soon as site is available and weather conditions are suitable. Planting shall be organized to coincide with construction progress and according to normal cycle of specified sod. Maintenance of sod shall immediately follow, coincide with and be continuous during the planting operations.

B. Provide sod as indicated on the Drawings.

1. Grade areas to 2" below top of adjacent walks, curbs, etc., filling as needed or removing surplus dirt and floating areas to a smooth, uniform grade. All sodded areas shall slope to drain. (Such as catch basins, elevations at steps or building). Rake and level to obtain true and even surface.

2. Areas shall have a smooth and continual grade between existing or fixed controls.

3. Loosen soil to a depth of six (6) inches in sodded areas by approved method of cultivation and grade to remove ridges and depressions. Remove stones or foreign matter over one (1) inch in diameter from top two (2) inches of soil. Float areas to approximate finish grades.

4. Apply soil amendments as specified above, incorporating into soil to the depth indicated by thorough cultivation as directed and approved by the Landscape Architect. Rake, float and roll until ridges and depressions disappear and areas are in a smooth and uniform condition.

5. Irrigate sodded areas prior to installation of sod. Soil shall be damp for a depth of one (1) inch minimum.

6. Sod shall be laid in strict accordance with standard horticultural practices.

7. Sod shall be secured to all slopes greater than 3:1 with ten (10) inch wood stakes paced at intervals no greater than 3'-0" on center.

8. Sod shall be maintained by the Landscape Contractor for the specified maintenance period or as long as necessary to provide a healthy stable turf, firmly knitted to the soil and free of any areas of erosion or washout damage.

9. Sodded area shall then be lightly rolled once.

10. Sodded area shall be watered regularly. Contractor shall ensure that sod is kept moist, after which turf shall be watered at intervals necessary to ensure healthy growth.

11. Final Inspection. No sod will be accepted until approved by the Landscape Architect.

END OF SECTION

SECTION 32 93 00

TREES AND SHRUBS

PART 1 - GENERAL

1.01 Quality:

A. Quality of plants shall conform to the State of California Grading Code of Nursery Stock #1 Grade, and full sized. They shall be vigorous, of normal growth, free of disease, insects and latent defects.

1.02 Related Work Specified Elsewhere:

A. Soil Preparation Section 32 91 13
B. Landscape Maintenance Section 32 01 90

1.03 Plant Stock:

A. All Trees - See Planting Plan.

B. All Shrubs - Height & spread requirements varies with species.

C. Ground Cover - Shall be 2-year number 1 stock as defined in the American Standard for Nursery Stock.

1.04 Pruning:

A. Pruning shall not be done prior to delivery except by specific written approval of the Owner's Representative.

1.05 Inspection:

A. Inspection of plant materials required by City, County, State or Federal authorities shall be the responsibility of the Contractor, and he shall have secured permits or certificates prior to delivery of plants to delivery of plants to the site.

B. Contractor shall notify Owner's Representative prior to planting for plant material inspection. Plants shall be subject to inspection and approval or rejection at place of growth and on the project site at any time before or during the process for size, variety, condition, latent defects and injuries. Rejected plants shall be removed from the project site immediately.

1.06 Substitutions:

A. Substitutes will not be permitted unless specifically approved, in writing, by the Owner's Representative.

1.07 Quantities:

A. Quantities shall be furnished as needed to complete work on drawings whether correctly estimated
or not.

PART 2 - MATERIALS

2.01 Trees: See Plant List on drawings.

2.02 Shrubs: See Plant List on drawings.

2.03 Nitrolized Fir: 1/4" maximum size with 1% Nitrogen added.

2.04 Commercial Fertilizer: Agriform 21 gram (20-10-5) Planting Tablets or Best Paks (20-10-5).

2.05 Tree Stakes: Shall be 2" in diameter, 10' in length Lodge Pole treated with copper napthenate.

2.06 Tree Ties: Tree ties shall be Wonder Tree Tie, available at Orange Co. Farm Supply (714-978-6500) or equal.

PART 3 - EXECUTION

3.01 Planting:

A. No planting shall be done until all operations in conjunction with the installation of the irrigation system have been completed, final grades have been established and the work approved by the Landscape Architect.

B. The relative position of all trees and shrubs is subject to approval by the Landscape Architect and Owner, and they shall, if necessary, be relocated as directed as part of the Contract.

C. Plants shall not be allowed to dry out before or while being planted. Keep exposed roots moist by means of wet sawdust or burlap at all times during planting operations. Do not expose roots to the air except while being placed on the ground. Wilted plants, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.

D. All plants shall be removed from their containers and set so that, when settled, they bear the same relation to the required grade that they bore to the natural grade before being transplanted. Each plant shall be planted in the center of the pit and backfilled, unless otherwise specified, with the prepared soil. No soil in muddy condition shall be used for backfilling. No filling will be permitted around trunks and stems. All broken or frayed roots shall be properly cut off.

E. The prepared soil shall be "**machine mixed"** in an area adjacent to the planting work and be accurately proportioned using a suitable measuring container. Unused

excavated soil shall be cleaned up and disposed of on or off the site. The prepared mix shall be protected from water until it has been placed in backfill around the plants.

F. Stake plant locations and obtain approval from the Owner's Representative before excavating pits, making necessary adjustments as directed. Plants not dimensioned as to precise locations on the drawings shall be scaled from the drawings and plant placed in the appropriate relationship.

3.02 Backfill:

A. Shall be 50% nitrolized fir treated with 1% nitrogen mix blended with existing native soil, or Approved imported soil. Backfill shall be machine mixed and the Owner's Representative must approve consistency of mix before planting begins.

3.03 Planting Tablets or Plant Paks.

A. Planting Tablets or Plant Paks shall be placed 6-8" deep at the side of root ball at the following rates:

	Agriform 21 gram Plant Tabs	Best-Paks
1-gallon can plants	1 tablet	1 Pak
5-gallon can plants	3 tablets	3 Paks
15-gallon can plants	6 tablets	9 Paks

Plants in large boxes - 2 tablets or 2 paks for each "1/2 of tree trunk diameter (6" above soil level) or for each foot of height or spread of shrubs.

3.04 Installation:

A. For planting, a hole two (2) times the diameter and 6 inches below the root ball, as specified on plans, shall be dug for each plant. All material resulting from excavation of plant holes, other than the existing top soil shall be placed in bottom of each hole to a growing depth at which the plant, when planted, will be 1" above normal growing depth. **Machine mixed backfill** shall be added around root ball of the plant until the backfill is half-way up the root ball then the hole shall be watered sufficiently to settle the backfill around the root ball. More backfill shall be firmed sufficiently to force air pockets from each hole.

B. No boxed, balled or canned plants shall be planted if the ball is broken or cracked, whether before of after the process of planting. Any trees transplanted by the Contractor that dies or has bark, branch of die-back injury shall be replaced with equal trees approved by the Owner's Representative at the Contractor's expense.

C. Where subsurface soil and conditions (hardpan) require drainage holes for proper tree development, as determined by the Landscape Architect, the Contractor shall provide the required drainage holes by means of drilling. The depth of the drainage hole shall be determined as follows:

1. The hole must penetrate through and beyond the underlying hardpan soil stratum.
2. The hole shall be drilled to a depth where visual evidence of the sub-surface sand or gravel drainage stratum is apparent.
3. If no sand or gravel drainage stratum is apparent, the drainage hole shall be drilled to a minimum of ten (10) feet deep.

3.05 Watering Basins

A. Construct a firmly compacted mound of soil around each tree, shrub or vine to form a watering basin at the edge of and following the shape of the planting pit area. Mounds for trees and for vines from five gallon or larger containers shall be at least 4" high. Mounds for all other trees, shrubs or vines not otherwise specified shall be at least 2" high. Excavated earth, if capable of retaining water, may be used. Any settlement within the basins after watering shall be refilled to the required grade with prepared soil and additional nitrogen stabilized shavings worked into the surface as required to restore the mulched condition.

3.06 Guarantee and Replacement:

A. The guarantee period shall begin at completion of maintenance or date of final acceptance by the Landscape Architect.

B. All shrubs and ground cover shall be guaranteed by the Contractor as to growth and health for a period of ninety (90) days after completion of the specified maintenance period and /or final acceptance by the Landscape Architect. All trees smaller than 15-gallon size shall be guaranteed by the Contractor to live and grow in an acceptable upright position for a period of six (6) months after completion of the specified maintenance period and/or final acceptance by the Landscape Architect. Trees 15 gallon or larger, and all boxed specimens shall be guaranteed by the Contractor to live and grow in an acceptable upright position for a period of one (1) year.

C. All plants that show signs of failing growth at any time during the life of the Contract, including the maintenance period or those plants so injured or damaged as to render them unsuitable for the purpose intended, shall be immediately replaced in kind and size at the expense of the Contractor.

D. The Contractor, within five (5) days of notification by the Landscape Architect, shall remove and replace all guaranteed plant materials which, for any reason, fail to meet the requirements of the guarantee. Replacement shall be made with plant materials as indicated or specified for the original planting and all such replacement materials shall be guaranteed as specified for the original guaranteed materials.

END OF SECTION

SECTION 32 93 13

GROUND COVER

PART 1 - GENERAL

1.01 Work Included:

A. Installation of Ground Cover.

1.02 Related Work Specified Elsewhere:

A. Soil Preparation Section 32 91 13
B. Landscape Maintenance Section 32 01 90

PART 2 - MATERIALS

2.01 Ground Cover:

A. Refer to Planting Legend.

2.02 Weed Control:

A. As recommended by licensed Pest Control Advisor (P.C.A.).

PART 3 - EXECUTION

3.01 Pre-water:

A. Pre-water all ground cover areas thoroughly for one week or as directed by the Landscape Architect to germinate weed seeds.

3.02 Weed Control:

A. Weed Control shall be recommended by a licensed Pest Control Advisor (P.C.A.) and applied by a licensed Pest Control Operator (P.C.O.).

3.03 Ground Cover:

A. Ground Cover shall have been grown in flats, pots or cans and shall remain in those containers until transplanted. At the time of transplanting, the flat soil shall contain sufficient moisture so the soil does not fall apart when lifting plants from the flat. Each plant shall be planted with its appropriate amount of flat soil in a manner that will ensure a minimum disturbance to the root system. The ground cover will not be allowed to dry out before or while being planted. Wilted plants will not be accepted. Ground cover shall be planted into soils that are moist (not wet).

3.04 Installation:

A. Install ground cover in all areas at the required spacing as shown on the plans.

3.05 Mulching:

A. After shrubs and ground cover have been planted, two (2) inches of shredded fir bark shall be placed over all areas as a top dressing. Any re-emergence required shall be applied prior to the application of the two-(2) inches of shredded fir top dressing material.

END OF SECTION

SECTION 33 11 16

SITE WATER DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Pipe and fittings for water piping.
   2. Valves and valve boxes.
   3. Fire Hydrant and Accessories.
   4. Accessories.

B. Related Sections include the following:
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 00 and 01 Sections, apply to this work.
   2. Section 31 23 00 – Trench Excavation and Backfilling
   3. Section 32 13 13 – Site Concrete Improvements

C. References
   1. ASTM D-1557.
   2. ANSI/ASTM D2466 - Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
   3. ANSI/AWWA C110 - Ductile Iron and Grey-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids.
   4. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
   5. ANSI/AWWA C500 - Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.
   6. ANSI/AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water.
   7. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and Class 200.
   8. ASTM D2855 - Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.
   9. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.03 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Accurately record actual locations of piping mains, valves, connections, and appurtenances.

C. Identify and describe discovery of uncharted utilities, or utilities found at locations different than indicated on plans.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with product manufacturer's recommendations and these Contract Documents.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Provide an approved protective wrap or coating for all metallic pipe, fittings, and appurtenances in contact with soil.

D. Delivery, Storage, and Handling
1. Deliver, store, protect and handle all products required.

PART 2 - PRODUCTS

2.01 WATER PIPE

A. Ductile Iron Pipe (for fire line and fire hydrant lateral): ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, thickness Class 50, with cement - mortar lining and seal coating per ANSI/AWWA C104/A21.4.
1. Fittings: ANSI/AWWA C110/A21.10, ductile iron.
2. Joints: Flanged.

B. PVC Pipe (4" and larger, underground): ANSI/AWWA C900, 1120 high impact, Pipe class as designated on the plans.
1. Fittings: ANSI/AWWA C111, cast iron.
2. Joints: ASTM D3139 compression gasket ring.

C. PVC Pipe (3" and smaller, underground): ANSI/AWWA Schedule 40.
1. Fittings: ANSI/AWWA Schedule 80.

2.02 GATE VALVES - UP TO 2 INCHES (50 MM)

A. Use full port ball valves for 2" and smaller and gate valves for 2-1/2" and larger size.

B. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, IPS ends.

2.03 GATE VALVES - 2-1/2 INCHES (63 MM) AND OVER

A. ANSI/AWWA C500, Iron body, bronze trim, non-rising stem with square nut or control handle wheel, single wedge, threaded or flanged.

2.04 VALVE BOXES

A. Precast Reinforced Concrete. Cast iron lid marked for service. Christy G5 or approved equal.

2.05 ACCESSORIES

A. Concrete for Thrust Blocks and Valve Box Surface Collars: Concrete type specified in Section 321313.

B. Valve Boxes and Covers: Christy No. G5 traffic box, or approved equal. Cover marking shall read "Water". A one piece PVC riser extension shall be provided as necessary to allow unobstructed access to valve operating nut.

C. Solvent Cement and Primer for PVC Pipe and Fittings: Per ASTM F656 and ASTM D2564.

2.06 VALVES, PIPES AND FITTINGS

A. All valves, pipes and fittings for the fire line must meet the requirements of NFPA 24, 3-1-1, 4-1-1 and 7-1-1, and NFPA 13, 3-4-1.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions. All plot dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and report any variations to the Inspector.

B. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. Carefully investigate the structural and finished conditions affecting all work, and plan work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between water systems, planting, and architectural features will be minimized.

C. Do not install the facilities as indicated on the drawings when it is obvious in the field that unknown obstructions might not have been considered in the engineering. Such obstructions or differences should be brought to the attention of the Inspector.

3.02 PREPARATION

A. Prepare for pipe installation by assembling all needed materials.

B. Cover all PVC pipe during storage.

3.03 BEDDING

A. Excavate trench, pit or hole in accordance with Section 312300 for work of this Section.

B. Where trench or pit has been overexcavated, place bedding material at bottom of excavations, level soil materials in continuous layers not exceeding 6 inches uncompacted depth.

C. Backfill to a level six inches above the top of pipe with bedding sand, tamped in place. Backfill trench per Section 31 23 00.

D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.04 INSTALLATION - PIPE AND FITTINGS

A. Install pipe at locations and depths indicated on plans.

B. Install pipe, fittings, and associated materials in accordance with manufacturer's recommendations.

C. Route pipe in straight line, whenever possible. All changes in direction of pipes shall be made with fittings, not by bending.

D. Install pipe to allow for expansion and contraction without stressing pipe or joints.

E. Form and place concrete for thrust blocks at each elbow, tee, angle or other significant change of direction in loose-joint pipe, per detail on plans.

F. Establish elevations of buried piping to ensure not less than 30 inches of cover, except at connections to existing lines, which may be shallower or deeper, or where shown otherwise on plans.

G. When two water pipes are to be installed in same trench, maintain 4 inch horizontal clearance between pipes.

H. Backfill trench or other excavation in accordance with Section 31 23 00.

3.05 INSTALLATION - VALVES

A. Set valves on solid bearing.

B. Where valves are installed below finish surface grade, center and plumb valve box and any necessary extensions over valve. Set box cover flush with finished grade.

C. Pour concrete collar around top of valve box per detail on plans.

D. Furnish and install valves and valve boxes in addition to those shown on plans as required for isolation of lines for construction and disinfection, while minimizing disruption of service to buildings, at no additional cost to Owner.

3.06 INSTALLATION - THREADED CONNECTIONS

A. Assemble all plastic and galvanized steel threaded pipe and fittings using an approved teflon tape applied to the male threads only. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved teflon tape will be required.

B. At all plastic (PVC) pipe connections, work the ductile iron connections first. Connections shall always be plastic into steel, never steel into plastic.

C. A non-hardening sealant and lubricant similar to Permatex #51 or LASCO blue pipe sealant may be used in lieu of teflon tape. Apply sealant to clean male threads, brushing into grooves, and to the first three threads of the female threads.

3.07 SALVAGE OF MATERIALS

A. Salvage and deliver to location specified by Owner all materials desired by Owner. Dispose of all materials not desired by Owner.

3.08 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ASTM D-1557.

B. If compaction tests indicate, work does not meet specified requirements, recompact and retest at no additional cost to Owner.

C. If tests indicate that work does not meet specified requirements, remove work, replace and retest at no additional cost to Owner.

END OF SECTION

SECTION 33 31 13

SANITARY SEWER FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Furnish and install site sanitary sewer collection systems and associated accessory items as shown on the Drawings and as specified herein. Items include, but are not necessarily limited to, the following:
      a. Sanitary Sewer Pipelines and Services
      b. Cleanouts
      c. Manholes
   2. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

B. References
   1. American Water Works Association (AWWA).
   2. American Society for Testing and Materials (ASTM):
      a. Designation D3034 - Polyvinyl Chloride (PVC) pipe.
      b. Designation A746 – Ductile Iron Gravity Sewer Pipe

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit manufacturer's data and/or fabrication drawings for all pipes, and appurtenances installed under this Section. No items shall be incorporated into the work until submittals are approved by the Architect.

1.03 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies
   1. Safety Regulations: Work shall comply with all Federal, State and Municipal regulations regarding safety, including the requirements of the following:
      a. William-Steiger Occupational Safety & Health Act of 1970.

b. State of California, California Administrative Code, Title 8 Industrial Relations, Chapter 4, Subchapter 4, "Construction of Safety Orders" and other State and local agencies having jurisdiction.
c. All trenching work shall conform to Trench Construction Safety Orders of California State Industrial Accident Commission.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleanout Boxes shall be precast reinforced concrete and cast iron lid marked for sewer service. Christy G5 or approved equal.

B. Sanitary sewer pipelines shall be polyvinyl chloride (PVC) pipe for sanitary sewers conforming to ASTM Designation: 3034, SDR35 for 4" and larger and be Schedule 40 PVC pipe, ASTM D1785, 1120 high impact, for 3" and smaller, unless otherwise noted.

C. Ductile iron sewer pipe shall conform to ASTM A746 and have Protecto 401 internal coating. Ductile iron pipe shall be encased in a corrosion resistant polyethylene sleeve.

D. Concrete for structures shall conform to Section 32 13 13 “Site Concrete Improvements”.

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION

A. Trench excavation and backfilling shall be in accordance with Section 31 23 00, “Trench Excavation and Backfill”.

3.02 PIPE INSTALLATION

A. Pipe Laying: Sewer pipe shall be laid in strict conformity to the prescribed line and grade, with grade bars set and each pipe length checked to the grade line. Three consecutive points on the same rate of slope shall be used at all times to detect any variation from a straight grade. In case any discrepancy exists, the work shall be stopped and the discrepancy immediately reported to the Architect. In addition, when requested by the Architect, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer

pipe between manholes. The elevation of the pipe invert shall not deviate from the design elevation by more than +2 percent to the pipe size concerned, or 1 inch, whichever is greater. The rate of deviation from grade or returning to grade shall be limited to 1/16 inch per foot of pipe.

Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe placed upstream. Each section of pipe shall be laid to line and grade as herein specified and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The interior of the pipe shall be cleared of all dirt and debris and excess joint sealing material as the work progresses. Pipe shall not be laid when the condition of the trench or weather is unsuitable. All open ends of pipe and fittings shall be adequately and securely closed whenever the work is discontinued for more than one-half hour. If pipe with elliptical or quadrant reinforcement is used, care shall be taken to properly orient the axis.

Where plain end vitrified clay pipe with the compression coupling is installed, the contractor shall tighten the compression bands as pipe lying process. The first length of pipe laid on any run, except where a connection is made to an exiting line, shall be anchored securely to prevent movement when each succeeding length is pushed home. After each compression band is torqued, the Contractor shall replace and tamp any bedding material that may have been displaced under the pipe and particularly under the coupler before proceeding with the initial backfill.

Backfill to a level six inches above the top of pipe with bedding sand, tamped in place. Backfill trench per Section 31 23 00.

All joint surfaces shall be cleaned before joints are made.

B. Sewer Systems Plugs: Temporary plugs of brick or mortar shall be installed on all sewer projects at points of connection to existing facilities. These plugs shall remain in place until completion of the balling and flushing operation. The plugs, intended to prevent water from the balling and flushing operation, drainage, or any other condition from entering the existing system, shall be installed or removed in the presence of and under the direct supervision of the Engineer. Until the system has been pumped clear of accumulated water, the plugs shall not be removed. This water must not be allowed to enter adjacent sewer or drainage systems.

C. Internal Inspection: Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which in the opinion of the Architect resulted from the new installation, shall also be removed by the Contractor. Sewer pipes shall be cleaned by the controlled balling method. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility. Temporary

plugs for sewer systems shall also conform to Subsection B, above. Water from the drainage system operations shall be routed through a suitable trap to collect any dirt and debris prior to discharging into any downstream facility. The Contractor shall notify the Architect immediately after completion of the pipe cleaning operations. Cleaning of drainage pipes by the controlled balling method will not be required.

As soon as possible after the completion of the pipe cleaning, and prior to final acceptance, the Architect may make a visual internal inspection of the new pipeline either manually or with television equipment.

3.03 CLEANOUTS

A. Install cleanouts at locations shown on the Plans. Locate cleanouts in accessible locations and bring flush to finished surface.

3.04 TESTING OF SANITARY SEWERS

A. After cleaning per Section 3.2 C, each section of sewer constructed shall be tested in accordance with acceptable "Low Pressure Air Test for Sanitary Sewers" methods such as presented in the Journal of Sanitary Engineering, Division ASCE, April 1964.

3.05 ADJUSTMENT

A. Adjustment of sewer manholes and cleanouts to finish grade shall be as per the detail drawings.

3.06 CLEAN-UP

A. Remove from the site all rubbish, debris, etc. resulting from Work in this Section. The clean up shall include the replacement and repair of any damaged or disturbed property.

END OF SECTION

SECTION 33 41 00

STORM DRAINAGE

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Provide all materials, labor, equipment and services necessary to furnish and install Storm Drainage System, accessories and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.

B. Related Sections include the following:
   1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Divisions 00 and 01 sections, apply to this work.
   2. Section 31 23 00 – Trench Excavation and Backfilling.
   3. Section 32 13 13 – Site Concrete Improvements.

C. References
   1. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
   2. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
   3. ANSI/ASTM C478 - Precast Reinforced Concrete Manhole Sections.
   4. ASTM-D1557

D. Definitions
   1. Bedding: Fill placed under, around, beside and directly over pipe, prior to subsequent backfill operations.
   2. Utility: Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Certificates of compliance for material.

C. Product Data: Provide data indicating pipe, accessories, and associated equipment to be furnished.

D. Submit manufacturer's data and/or fabrication drawings for all pipes, and appurtenances installed under this Section. No items shall be incorporated into the work until submittals are approved by the Architect.

1.03 COORDINATION

A. Coordinate work with District personnel.

B. Verify that the location of existing utilities have been indicated at work site by utility authorities and Campus personnel.

C. Coordinate work with other project work.

1.04 EXISTING UTLITIES

A. The Engineer has made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

B. Service laterals and appurtenances have also been shown where information was available as to their location. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

C. At new work location, expose by hand methods all existing utilities along the route of the new work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand methods to locate all existing facilities as indicated on the plans, and as indicated at the work site by District personnel.

D. Maintain all existing utility mains and service lines in constant service during construction of the Work.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 013300 – Submittal Procedures.

B. Accurately record actual locations of utilities encountered.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforced Concrete Pipe for pipe larger than fifteen (15) inches or larger: ANSI/ASTM C76, Class 3, with rubber gasket joints per ANSI/ASTM C443.

B. Storm drainage sewer pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ASTM designation 3034, SDR 35 for pipe twelve (12) inches or less.

C. Storm drainage pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ANSI/AWWA Schedule 40 for pipe three (3) inches or less.

D. Perforated storm drainage pipeline shall be ABS pipe for storm sewer conforming to ASTM F405

E. Poured in Place Concrete: Per Section 32 13 13 – Site Concrete Improvements.

F. Reinforcement: Per Section 32 13 15 - Reinforcement.

G. Mortar: Composed of one part, by weight, portland cement (Type II low alkali per ASTM C150), 2 parts, by weight, sand, and water.

H. Manhole Frames, Covers and Grates: Cast Iron per ASTM A48, Class 25.

I. Soil Fill for Concrete Pipe Bedding Envelope: Backfill or Sandfill per Section 31 22 22 and Section 31 23 00.

J. Concrete collar shall be constructed as per detailed drawing.

K. Cleanout shall be constructed as per detail drawing.

L. All metallic pipe, fittings and appurtenances in contact with soil shall be coated or wrapped with an approved material, as required to protect it from corrosive soil.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

3.02 PREPARATION

A. Identify location of proposed storm drainage facilities to be constructed. Expose connection points to existing system.

B. Locate, identify, and protect existing above and below grade utilities from damage.

C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.

D. Protect existing structures and other improvements to remain from damage from excavation equipment and vehicular traffic.

E. Employ equipment and methods appropriate to the work site.

F. Protect excavated areas from drainage inflow, and provide drainage to all excavated areas. Dewater existing drainage basins and existing drainage pipeline systems as necessary to accomplish the work.

G. Comply with safety requirements as they pertain to excavations, per Section 31 23 00.

H. Remove all interfering surface and subsurface improvements authorized for removal.

3.03 EXCAVATION

A. Excavate soil required to locate existing utilities and install the work.

B. Excavate trenches and pits per Section 31 23 00.

C. Excavate trenches and pits to allow installation and construction of the storm drainage facilities to the alignment, grades, depths and cross-sections as indicated on the construction plans.

D. Excavate trench to depth which is 4-inches below the outside bottom of the pipe barrel to be placed therein.

E. Cut trenches just wide enough to allow the installation of the pipe and pipe bedding as indicated on the plans. Minimize trench width above the pipe.

F. Provide protection to public per Division 01.

3.04 INSTALLATION AND BEDDING OF STORM DRAIN PIPE

A. Install the pipe and fittings to the lines and grades shown on the construction plans.

B. Install pipe and fittings in accordance with the manufacturer's recommendations, and these specifications.

C. Unless otherwise approved by the Engineer, lay all pipe upgrade from structure to structure, with bell or socket ends of pipe upgrade.

D. Excavate suitable bell (or socket) holes in the bedding material, so that the bells do not bear on the subgrade or bedding. Provide uniform bearing of pipe barrel on bedding material.

E. Ensure that all joints are properly "homed" and are watertight.

F. Backfill to a level six inches above the top of pipe with bedding sand, tamped in place. Backfill trench per Section 31 23 00.

3.05 INSTALLATION OF STORM DRAINAGE STRUCTURES AND APPURTENANCES

A. Install storm drainage structures as indicated on the construction plans, in accordance with the manufacturer's recommendations, and as specified herein.

B. Construct poured-in-place concrete per Section 32 13 13.

C. Key top of poured-in-place concrete bases for structures to receive the tongue of precast riser sections.

D. Construct cleanout, outfall structure per detail drawing.

3.06 BACKFILLING TO FINISHED GRADE AND FINISHED GRADING

A. Place and compact backfill per Section 31 23 00.

B. Conform finished surface to the lines, grades and cross-sections shown on the plans, or as otherwise directed by the Inspector.

C. In areas to receive paving or a significant thickness of sealing material, temporarily set manhole frame and cover below finish grade, then return after final surfacing and/or pavement sealing and bring manhole frame and cover to final grade, as shown on the plans.

D. Fine grade all finished soil surfaces disturbed to the lines, grades and cross-sections shown on the plans.

E. Rake and smooth all finished dirt surfaces.

3.07 TOLERANCES

A. Pipe laying tolerances:
   1. Above grade: Not to exceed 1/4-inch above planned grade.
   2. Below grade: Not to exceed 1/2-inch below planned grade.
   3. Alignment: Not to exceed 2-inches from planned alignment, if gradual and regular over a distance of 20-feet.

B. Structure finish grade tolerance: Within 1/4-inch of planned grade, but must match adjacent improvements.

3.08 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01 and General Conditions.

B. Compaction testing of bedding and backfill will be performed in accordance with ASTM D 1557.

C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest at no additional cost to Owner.

END OF SECTION

Executed in Duplicate

Performance Bond

Bond No. 9041113

RIDER

To be attached to and form a part of Zumwalt Construction, Inc. Bond, No. 9041113

dated the 30th day of January, 2017 issued by

Zurich North America Surety as Surety, on behalf of

Zumwalt Construction, Inc., as Principal,

in the penal sum of Four Million Five Hundred Sixty Eight Thousand Two Hundred Twenty Nine and No/100

Dollars ($ 4,568,229.00), and in favor of The County of Fresno

In consideration of the premium charged for the attached bond, it is hereby agreed that the attached bond be amended as follows:

Surety is corrected to read: Fidelity and Deposit Company of Maryland

Provided, However, that the attached bond shall be subject to all its agreements, limitations and conditions except as herein expressly modified, and further that the liability of the Surety under the attached bond and the attached bond as amended by this rider shall not be cumulative.

This rider shall become effective as of the 30th day of January, 2017

Signed, sealed and dated this 8th day of Febuary, 2017

Zumwalt Construction, Inc.

ATTEST:

By _____

_____ PRINCIPAL Kurt E. Zumwalt, President

Fidelity and Deposit Company of Maryland

ACCEPTED:

By _____

Gary E. Richards, Attorney-in-Fact

GEN90004ZZ1001f

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

County of Fresno)

On 2/14/17 before me, Danette Cody, Notary Public,
(insert name and title of the officer)

personally appeared Gary E. Richards

,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DANETTE CODY
NOTARY PUBLIC - CALIFORNIA
COMMISSION # 2051471
FRESNO COUNTY
My Comm. Exp. January 8, 2018

Signature Danette Cody

(Seal)

---------- Optional Information ----------

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgement to an unauthorized document.

Description of Attached Document

The preceding Certificate of Acknowledgement is attached to a document titled/for the purpose of Zumwalt Construction Rider to Bond #9041113 correcting surety name,

containing 1 pages and dated 2/08/17.

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **Michael P. Bond, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Gary E. RICHARDS, John SAMARIN, Shelly WELDON, Jeanie SWAN, Christine EMMONS and Danette CODY, all of Fresno, CA, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 25th day of January, A.D. 2017.

ATTEST:
ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: Michael P. Bond
Vice President

By: Eric D. Barnes
Secretary

State of Maryland
County of Baltimore

On this 25th day of January, A.D. 2017, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Michael P. Bond, Vice President and Eric D. Barnes, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 8th day of February, 20 17.

Gerald F. Haley

Gerald F. Haley, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:

Zurich Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056
www.zurichna.com/en/claims

ISSUED IN DUPLICATE

FAITHFUL PERFORMANCE BOND
PUBLIC WORK

Bond No. 9041113

(The premium charged on this bond is $ 37,984.00 , being at the rate of $ ** per thousand of the contract price)

** $14.09 FIRST $500,000; $8.51 NEXT $2,000,000; $6.73 REMAINING $2,068,229

KNOW ALL MEN BY THESE PRESENTS:

THAT, WHEREAS the COUNTY OF FRESNO

State of California, entered into a contract dated JANUARY 10 , 2017 , with

ZUMWALT CONSTRUCTION, INC.

hereinafter designated as the "Principal,"

for the work described as follows: CRISIS RESIDENTIAL TREATMENT FACILITY; CONTRACT NO. 16-S-05

496 SOUTH BARTON AVENUE

FRESNO, CA ; and

WHEREAS, the said Principal is required under the terms of said contract to furnish a bond for the faithful performance of said contract.

NOW, THEREFORE, We, the Principal, and ZURICH NORTH AMERICA SURETY, a corporation organized and existing under the laws of the State of ILLINOIS , and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto

THE COUNTY OF FRESNO in the penal sum of

SEE BELOW Dollars ($4,568,229.00),

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

FOUR MILLION FIVE HUNDRED SIXTY EIGHT THOUSAND TWO HUNDRED AND TWENTY NINE AND NO/100

THE CONDITION OF THIS OBLIGATION IS SUCH, That, if the above bounden Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said contract and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according, to their true intent and meaning, and shall indemnify and save harmless the COUNTY OF FRESNO its officers and agents, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF, We have hereunto set our hands and seals this 27TH day of JANUARY , 2017 .

ZUMWALT CONSTRUCTION, INC.

By _____ *Principal*

KURT E. ZUMWALT, PRESIDENT

ZURICH NORTH AMERICA SURETY

By _____

GARY E. RICHARDS , *Attorney-in-Fact*

PRF71001CA0201f

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

County of Fresno)

On 1/27/17 before me, Danette Cody, Notary Public,
(insert name and title of the officer)

personally appeared Gary E. Richards,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DANETTE CODY
NOTARY PUBLIC - CALIFORNIA
COMMISSION # 2051471
FRESNO COUNTY
My Comm. Exp. January 8, 2018

Signature Danette Cody

(Seal)

---------- Optional Information ----------

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgement to an unauthorized document.

Description of Attached Document

The preceding Certificate of Acknowledgement is attached to a document titled/for the purpose of Zumwalt Construction, Inc. Performance Bond for County of Fresno,

containing 1 pages and dated 1/27/17.

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **Michael P. Bond, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Gary E. RICHARDS, John SAMARIN, Shelly WELDON, Jeanie SWAN, Christine EMMONS and Danette CODY, all of Fresno, CA, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 25th day of January, A.D. 2017.

ATTEST:
ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: Michael P. Bond
Vice President

By: Eric D. Barnes
Secretary

State of Maryland
County of Baltimore

On this 25th day of January, A.D. 2017, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Michael P. Bond, Vice President and Eric D. Barnes, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 27th day of January, 2017.

Gerald F. Haley

Gerald F. Haley, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:

Zurich Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056
www.zurichna.com/en/claims

Executed in Duplicate

Payment Bond

Bond No. 9041113

RIDER

To be attached to and form a part of Zumwalt Construction, Inc. Bond, No. 9041113

dated the 30th day of January ,2017 issued by

Zurich North America Surety as Surety, on behalf of

Zumwalt Construction, Inc. , as Principal,

in the penal sum of Four Million Five Hundred Sixty Eight Thousand Two Hundred Twenty Nine and No/100

Dollars ($ 4,568,229.00), and in favor of The County of Fresno

In consideration of the premium charged for the attached bond, it is hereby agreed that the attached bond be amended as follows:

Surety is corrected to read: Fidelity and Deposit Company of Maryland

Provided, However, that the attached bond shall be subject to all its agreements, limitations and conditions except as herein expressly modified, and further that the liability of the Surety under the attached bond and the attached bond as amended by this rider shall not be cumulative.

This rider shall become effective as of the 30th day of January , 2017

Signed, sealed and dated this 8th day of Febrauary , 2017

Zumwalt Construction, Inc.

ATTEST:

PRINCIPAL { By

Kurt E. Zumwalt, President

Fidelity and Deposit Company of Maryland

ACCEPTED:

By

Gary E. Richards , Attorney-in-Fact

GEN90004ZZ1001f

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

County of Fresno)

On 2/14/17 before me, Danette Cody, Notary Public,
(insert name and title of the officer)

personally appeared Gary E. Richards

,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DANETTE CODY
NOTARY PUBLIC - CALIFORNIA
COMMISSION # 2051471
FRESNO COUNTY
My Comm. Exp. January 8, 2018

Signature Danette Cody

(Seal)

---------- Optional Information ----------

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgement to an unauthorized document.

Description of Attached Document

The preceding Certificate of Acknowledgement is attached to a document titled/for the purpose of Zumwalt Construction Rider to Bond #9041113 correcting surety name,

containing 1 pages and dated 2/08/17.

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **Michael P. Bond, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Gary E. RICHARDS, John SAMARIN, Shelly WELDON, Jeanie SWAN, Christine EMMONS and Danette CODY, all of Fresno, CA, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 25th day of January, A.D. 2017.

ATTEST:
ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: Michael P. Bond
Vice President

By: Eric D. Barnes
Secretary

State of Maryland
County of Baltimore

On this 25th day of January, A.D. 2017, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Michael P. Bond, Vice President and Eric D. Barnes, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 8th day of February, 2017.

Gerald F. Haley

Gerald F. Haley, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:

Zurich Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056
www.zurichna.com/en/claims

ISSUED IN DUPLICATE

Bond No. 9041113

PAYMENT BOND
PUBLIC WORK

Section 3247-3252 inclusive, Civil code)
(Premium included in Faithful Performance Bond)

KNOW ALL MEN BY THESE PRESENT:

That, Whereas
THE COUNTY OF FRESNO

has awarded to
ZUMWALT CONSTRUCTION, INC.

as Principal, a contract for the work described as follows:
CRISIS RESIDENTIAL TREATMENT FACILITY, CONTRACT #16-S-05
496 SOUTH BARTON AVENUE, FRESNO, CA

AND WHEREAS, said Principal is required ad to furnish a bond in connection with said contract, to secure the payment of claims of laborers, mechanics, materialmen, and other persons as provided by law:

NOW, THEREFORE, We the undersigned Principal and Surety are held and firmly bound unto the
COUNTY OF FRESNO

in the amount required by law, the sum of
FOUR MILLION FIVE HUNDRED SIXTY EIGHT THOUSAND TWO HUNDRED TWENTY NINE AND NO/100

Dollars ($ 4,568,229.00) for which payment well and truly be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, That if said Principal, his or its heirs, executors, administrators, successors or assigns, or subcontractors, shall fail to pay any of the persons named in Civil Code Section 3181, or amounts due under the Unemployment's Insurance Act with respect to work or labor performed by any such claimant, or for any amounts required to be deducted, withheld, and paid over the Employment Development Department from the wages of employees of the principals and his subcontractors pursuant to section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the Surety or Sureties herein will pay for the same in the amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, the said surety will pay a reasonable attorney's fee to be fixed by the court.

In witness Whereof, We have hereunto set our hand and seals this 27TH day of JANUARY, 2017

ZUMWALT CONSTRUCTION, INC.
Principal

By: _____
KURT E. ZUMWALT, PRESIDENT

ZURICH NORTH AMERICA SURETY

By: _____
GARY E. RICHARDS, Attorney-In-Fact

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

County of Fresno)

On 1/27/17 before me, Danette Cody, Notary Public,
(insert name and title of the officer)

personally appeared Gary E. Richards,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DANETTE CODY
NOTARY PUBLIC - CALIFORNIA
COMMISSION # 2051471
FRESNO COUNTY
My Comm. Exp. January 8, 2018

Signature Danette Cody

(Seal)

---------- Optional Information ----------

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgement to an unauthorized document.

Description of Attached Document

The preceding Certificate of Acknowledgement is attached to a document titled/for the purpose of Zumwalt Construction, Inc. Payment Bond for County of Fresno,

containing 2 pages and dated 1/27/17.

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **Michael P. Bond, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Gary E. RICHARDS, John SAMARIN, Shelly WELDON, Jeanie SWAN, Christine EMMONS and Danette CODY, all of Fresno, CA, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 25th day of January, A.D. 2017.

ATTEST:
ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: Michael P. Bond
Vice President

By: Eric D. Barnes
Secretary

State of Maryland
County of Baltimore

On this 25th day of January, A.D. 2017, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Michael P. Bond, Vice President and Eric D. Barnes, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 27th day of January, 2017.

Gerald F. Haley

Gerald F. Haley, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:

Zurich Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056
www.zurichna.com/en/claims

ZUMWCON-01 KLUIZ

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 1/27/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Christina Moreno	
Lodi-Alliant Insurance Services, Inc. 641 South Ham Ln Ste. B Lodi, CA 95242	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS: CMoreno@alliant.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : National Union Fire Ins Co Pittsburgh PA	19445
INSURED	INSURER B :	
Zumwalt Construction, Inc. 5520 E. Lamona Ave. Fresno, CA 93727	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER: 1

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS		
A	X COMMERCIAL GENERAL LIABILITY			3292156	09/01/2016	09/01/2017	EACH OCCURRENCE	$	1,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$	300,000
	X Owner's & Contractor						MED EXP (Any one person)	$	10,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY	$	1,000,000
	POLICY X PRO-JECT LOC						GENERAL AGGREGATE	$	2,000,000
	OTHER:						PRODUCTS - COMP/OP AGG	$	2,000,000
								$	
A	AUTOMOBILE LIABILITY			4544804	09/01/2016	09/01/2017	COMBINED SINGLE LIMIT (Ea accident)	$	1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$	
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$	
	X HIRED AUTOS / X NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$	
								$	
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$	
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$	
	DED RETENTION $							$	
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N	N / A		WC 025-89-3634	09/01/2016	09/01/2017	X PER STATUTE OTH-ER		
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?						E.L. EACH ACCIDENT	$	1,000,000
	(Mandatory in NH)						E.L. DISEASE - EA EMPLOYEE	$	1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - POLICY LIMIT	$	1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: JOB NO 17-001 CRISIS RESIDENTIAL TREATMENT FACILITY (CRT), 496 SOUTH BARTON AVENUE, FRESNO, CA 93702. 10 Day Notice of Cancellation Applies.

CERTIFICATE HOLDER

Fresno County Department of Public Works and Planning,
Capital Project Division
2220 Tulare Street, Sixth Floor
Fresno, CA 93721

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



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County of Fresno

DEPARTMENT OF PUBLIC WORKS AND PLANNING
STEVEN E. WHITE, DIRECTOR

February 28, 2017

Kurt E. Zumwalt, President
Zumwalt Construction, Inc.
5520 E. Lamona Avenue
Fresno, CA 93727

CERTIFIED MAIL

Dear Mr. Zumwalt:

Subject: Notice of Approval, Crisis Residential Treatment Facility, Contract No. 16-S-05

The contract between your firm and the County of Fresno for the referenced project became operative on February 24, 2017. Two copies of the executed contract are enclosed.

A "Notice to Proceed" authorizing commencement of the work will be issued by the Construction Engineer.

The attached copy of eh Section 41 of the Charter of the County of Fresno is for your reference and compliance.

If you have any question regarding this, please contact Mitch Araki at maraki@co.fresno.ca.us or by phone at (559) 600-4501.

Sincerely,

Mohammad Alimi, Ph.D., P.E.
Design Engineer

Dale Siemer, P.E.
Supervising Engineer

Enclosures

c: Board of Supervisors, Auditor-Controller, Financial Services, Construction Management, Design Division, Design Services

Fresno County Department of Public Works and Planning
Project: Crisis Residential Treatment Facility (CRT) **Revised 11/29/2016**
Contract No.: 16-S-05
Bid Opening Date: 11/18/2016

Cost Estimate: $3,477,000.00
$3,843,000.00
Award Date: 12/13/2016
Last Possible Award Date: 1/10/2017

BIDDER	BASE	ADD #1	ADD#2	ADD #3	ADD#4	TOTAL BID
Zumwalt Construction, Inc.	$ 4,416,277.00	$ 1,633.00	$ 66,098.00	$ 28,293.00	$ 55,928.00	$ 4,568,229.00
MARKO Construction Group, Inc.	$ 4,661,000.00	$ 5,500.00	$ 71,000.00	$ 55,000.00	$ 64,000.00	$ 4,856,500.00
SOLPAC Construction, Inc. dba Soltek Pacific Construction Company	$ 4,837,000.00	$ 2,900.00	$ 86,300.00	$ 34,200.00	$ 62,300.00	$ 5,022,700.00
Hal Hays Construction, Inc.	Non-Responsive					
Federal Solutions Group	Non-Responsive					

PROPOSAL TO THE BOARD OF SUPERVISORS

COUNTY OF FRESNO

Crisis Residential Treatment Facility (CRT)

Work to be performed: **Construction of new Crisis Residential Treatment Facility**

Building No. **TBD**

496 South Barton Avenue
Fresno, CA 93702
Contract No.: 16-S-05

State Grant Program and Project No.:

Fund / Subclass / Org / Account / Program or Memo Nos.:
0400 / 10051 / 8851 / 8150 /91191 year 2016

In case of a discrepancy between words and figures, the words shall prevail.

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Awarding Authority, within ten (10) days after the award of the contract, the Awarding Authority, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the Owner.

The undersigned, as bidder declares that all Addenda issued with respect to this bid have been received and incorporated into this Proposal. The bidder's signature on this Proposal also constitutes acknowledgement of all addenda.

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; that he has carefully examined the location of the proposed work, the annexed proposed form of contract, and the plan therein referred to; and he proposes and agrees if this proposal is accepted, that he will contract with the County of Fresno to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the following lump sum price, to-wit:

BIDDER: ZUMWALT CONSTRUCTION, INC.

Contract No.: 16-S-05 **Project:** Crisis Residential Treatment Facility (CRT)	
Lump Sum Price Written In Words	
1) Base Bid four million four hundred Sixteen thousand two hundred seventy seven Dollars	$4,416,277
2) Additive Bid 1 – Labyrinth. Base bid is top soil ~~one thousand six hundred and thirty three~~ ~~four thousand one hundred and 00/100~~ Dollars	1,633 ~~$4,100~~
3) Additive Bid 2 – Pavilion Structure including foundations, slab, framing, roof and the CMU wall. Base bid will be exterior concrete walk poured where slab is indicated. ~~sixty six thousand ninety eight~~ ~~Sixty five thousand and twenty four~~ Dollars	66,098 ~~$65,024~~
4) Additive Bid 3 – Wood Framed Glass Partition between Room 22 (Exercise Room) and Room 23 (Reading Room) and the frameless glass above the glue-lam beam. Base bid is to have no separation between the two rooms. The beam will remain in the base bid. ~~twenty eight thousand two hundred ninety three~~ ~~twenty eight thousand four hundred twenty eight~~ Dollars	28,293 ~~$28,428~~
5) Additive Bid 4 – Wood Acoustic Panels and the supporting hat channels above the Dining Room. Base bid is to finish with Gyp. Board directly below the roof rafters. ~~fifty five thousand nine hundred twenty eight~~ ~~fifty seven thousand one hundred fifty eight~~ ~~fifty six thousand one hundred ninety five~~ Dollars	55,928 ~~56,195~~ ~~$57,158~~
6) Total Bid - (1 + 2 + 3 + 4 + 5) four million five hundred sixty eight thousand two hundred twenty eight Dollars	$4,568,228
Acknowledgement of Addendum: Addendum No. 1 Dated 11/9/16 Addendum No. 3 Dated 11/14/16 Addendum No. 2 Dated 11/10/16 Addendum No. 4 Dated 11/15/16	

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

Accompanying this proposal is security (check one only) in amount equal to at least ten percent (10%) of the total amount of the bid:

Bid Bond (X); Certified Check ( ); Cashier's Check ( ); Cash ($_____)

The names of all persons interested in the foregoing proposal as principals are as follows:

IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if bidder or other interested person is an individual, state first and last name in full.

FIRM NAME ZUMWALT CONSTRUCTION, INC.

KURT E. ZUMWALT - PRESIDENT

Licensed in accordance with an act providing for the registration of Contractors,

Class B License No. 706140 Expires _____

(Furnishing Contractor License information as part of this proposal is optional and is requested to facilitate verification of licensure)

Signature of Bidder — Dated 11/17/16

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, his signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

BUSINESS ADDRESS: 5520 E. LAMONA AVE, FRESNO, CA 93727 (Zip Code)

MAILING ADDRESS: 5520 E. LAMONA AVE, FRESNO, CA 93727 (Zip Code)

BUSINESS PHONE: (559) 252-1000 FAX NUMBER: (559) 252-1005

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BID BOND **TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA**
Hartford, Connecticut 06183

KNOWN ALL BY THESE PRESENTS, That we, Zumwalt Construction, Inc. , as Principal, and Travelers Casualty and Surety Company of America, as Surety, are held and firmly bound unto The County of Fresno, as Obligee, in the sum of Ten Percent of the Bid Amount Dollars ($10% of the Bid Amount) for the payment of which we bind ourselves, and our successors and assigns, jointly and severally, as provided herein.

WHEREAS, Principal has submitted or is about to submit a bid to the Obligee on a contract for Crisis Residential Treatment Facility ("Project").

NOW, THEREFORE, the condition of this bond is that if Obligee accepts Principal's bid, and Principal enters into a contract with Obligee in conformance with the terms of the bid and provides such bond or bonds as may be specified in the bidding or contract documents, then this obligation shall be void; otherwise Principal and Surety will pay to Obligee the difference between the amount of Principal's bid and the amount for which Obligee shall in good faith contract with another person or entity to perform the work covered by Principal's bid, but in no event shall Surety's and Principal's liability exceed the penal sum of this bond.

Signed this 10th day of November, 2016.

Zumwalt Construction, Inc.
(Principal)

By: _____
Kurt E. Zumwalt, President

Travelers Casualty and Surety Company of America

By: _____
Gary E. Richards, Attorney-in-Fact

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

County of Fresno)

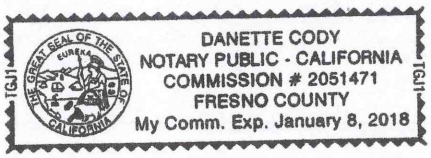
On 11/10/16 before me, Danette Cody, Notary Public,
(insert name and title of the officer)

personally appeared Gary E. Richards,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Signature Danette Cody

(Seal)

---------- Optional Information ----------

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgement to an unauthorized document.

Description of Attached Document

The preceding Certificate of Acknowledgement is attached to a document titled/for the purpose of Zumwalt Construction, Inc., Bid bond for The County of Fresno,

containing 1 pages and dated 11/10/16.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

TRAVELERS

POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company
St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 228807 **Certificate No.** 006812197

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Christina Piona, Shelly Weldon, Jeanie Swan, Christine Emmons, Gary E. Richards, Danette Cody, and John Samarin

of the City of Fresno, State of California, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

WARNING THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 25th day of May, 2016.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company
St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

State of Connecticut
City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the 25th day of May, 2016, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2021.

MARIE C. TETREAULT NOTARY PUBLIC CONNECTICUT

Marie C. Tetreault
Marie C. Tetreault, Notary Public

58440-5-16 Printed in U.S.A.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 10th day of November, 20 16

Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTORS

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of **one-half of one percent of the total bid presented herewith.** Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board. Submission of subcontractor's name, location of business and description of work, and their California contractor's license number is REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

SUBCONTRACTOR: JMA
Item No. or Description of Work: CONCRETE/BUILDING
Dollar Amount or Percentage of Total Bid _____
Business Address: Sanger CA
Class _____ License No. 996535 DIR Registration No. 1000002784

SUBCONTRACTOR: ~~SHOWTIME CONCRETE~~
Item No. or Description of Work: ~~SITE CONCRETE~~
Dollar Amount or Percentage of Total Bid _____
Business Address: ~~Fresno CA~~
Class _____ License No. ~~877691~~ DIR Registration No. ~~1000010875~~

SUBCONTRACTOR: Dorfmeier
Item No. or Description of Work: Masonry
Dollar Amount or Percentage of Total Bid _____
Business Address: Fresno CA
Class _____ License No. 861556 DIR Registration No. 1000002453

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTOR: CASCO FAB
Item No. or Description of Work: Structural Steel
Dollar Amount or Percentage of Total Bid
Business Address: Fresno CA
Class _____ License No. 433448 DIR Registration No. 1000000615

SUBCONTRACTOR: Architectural Wood Design
Item No. or Description of Work: Case work
Dollar Amount or Percentage of Total Bid
Business Address: Fresno CA
Class _____ License No. 780334 DIR Registration No. 1000019022

SUBCONTRACTOR: Sacramento Building Products
Item No. or Description of Work: Insulation
Dollar Amount or Percentage of Total Bid
Business Address: West Sacramento CA
Class _____ License No. 202026 DIR Registration No. 1000005805

SUBCONTRACTOR: Graham Pruett
Item No. or Description of Work: Roofing
Dollar Amount or Percentage of Total Bid
Business Address: Fresno CA
Class _____ License No. 793065 DIR Registration No. 1000002797

SUBCONTRACTOR: San Joaquin Glass
Item No. or Description of Work: Glass
Dollar Amount or Percentage of Total Bid
Business Address: Fresno CA
Class _____ License No. 248167 DIR Registration No. 1000010471

SUBCONTRACTOR: Carson Construction
Item No. or Description of Work: Plaster
Dollar Amount or Percentage of Total Bid
Business Address: Fresno CA
Class _____ License No. 710858 DIR Registration No. 1000003306

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC

SUBCONTRACTOR: JMC Drywall
Item No. or Description of Work: Drywall
Dollar Amount or Percentage of Total Bid
Business Address: Clovis CA
Class _____ License No. 986572 DIR Registration No. 1000005 1

SUBCONTRACTOR: J D Ballard
Item No. or Description of Work: Tile
Dollar Amount or Percentage of Total Bid
Business Address: Fresno CA
Class _____ License No. 297024 DIR Registration No. 1000002729

SUBCONTRACTOR: Ceiling Experts
Item No. or Description of Work: Ceiling work
Dollar Amount or Percentage of Total Bid
Business Address: Sacramento CA
Class _____ License No. 917629 DIR Registration No. 1000006305

SUBCONTRACTOR: ~~Michael Flooring~~
Item No. or Description of Work: ~~Flooring~~
Dollar Amount or Percentage of Total Bid
Business Address: ~~Bakersfield CA~~
Class _____ License No. ~~874947~~ DIR Registration No: ~~1000017164~~

SUBCONTRACTOR: Rosperich Painting
Item No. or Description of Work: Painting
Dollar Amount or Percentage of Total Bid
Business Address: Sanger CA
Class _____ License No. 757058 DIR Registration No. 1000000284

SUBCONTRACTOR: Wilson Fire Sprinklers
Item No. or Description of Work: Fire Sprinklers
Dollar Amount or Percentage of Total Bid
Business Address: Selma CA
Class _____ License No. 899212 DIR Registration No. 1000008581

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC

SUBCONTRACTOR: TP Thomas
Item No. or Description of Work: Plumbing
Dollar Amount or Percentage of Total Bid _____
Business Address: Dinuba CA
Class _____ License No. 613719 DIR Registration No. 1000007407

SUBCONTRACTOR: Lawson Mechanical
Item No. or Description of Work: HVAC / mechanical
Dollar Amount or Percentage of Total Bid _____
Business Address: Fresno, CA
Class _____ License No. 178385 DIR Registration No. 1000002024

SUBCONTRACTOR: Contra Costa Electric
Item No. or Description of Work: Electrical
Dollar Amount or Percentage of Total Bid _____
Business Address: Fresno CA
Class _____ License No. 139885 DIR Registration No. 1000001625

SUBCONTRACTOR: Dave Chinstian
Item No. or Description of Work: earthwork
Dollar Amount or Percentage of Total Bid _____
Business Address: Fresno CA
Class _____ License No. 377698 DIR Registration No. 1000002062

SUBCONTRACTOR: Mavin Construction
Item No. or Description of Work: Concrete
Dollar Amount or Percentage of Total Bid _____
Business Address: Fresno CA
Class _____ License No. 903787 DIR Registration No. 1000004412

SUBCONTRACTOR: Landscape Development
Item No. or Description of Work: Landscape
Dollar Amount or Percentage of Total Bid _____
Business Address: Bakersfield CA
Class _____ License No. 450067 DIR Registration No. 1000024024

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTOR: TP Thomas
Item No. or Description of Work: Site Utilities
Dollar Amount or Percentage of Total Bid _____
Business Address: Dinuba CA
Class _____ License No. 613719 DIR Registration No. 1000007407

SUBCONTRACTOR: Quality Carpets
Item No. or Description of Work: Flooring/carpet
Dollar Amount or Percentage of Total Bid _____
Business Address: Clovis CA
Class _____ License No. 989918 DIR Registration No. 1000023070

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____ DIR Registration No. _____

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

BIDDER: ZUMWALT CONSTRUCTION, INC.

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No._____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No._____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No._____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____DIR Registration No._____

SUBCONTRACTOR: _____
Item No. or Description of Work: _____
Dollar Amount or Percentage of Total Bid _____
Business Address: _____
Class _____ License No. _____DIR Registration No._____

PROJECT: Crisis Residential Treatment Facility (CRT)
CONTRACT: 16-S-05

To the Board of Supervisors, County of Fresno:

NONCOLLUSION AFFIDAVIT

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID *

KURT E. ZUMWALT
(Printed or Typed Name)

being first duly sworn, deposes and says that he or she is

PRESIDENT
(Owner, Partner, Corporate Officer (list title), Co-Venturer)

of ZUMWALT CONSTRUCTION, INC
(Bidding Entity)

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

(Signature) 11/17/16 (Dated)

(Title 23 United States Code Section 112)

(Calif Public Contract Code Section 7106; Stats.1988, c. 1548, Section 1.)

* NOTE: Completing, signing, and returning the Noncollusion Affidavit is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Proposal - 4.2

PROJECT: CRISIS RESIDENTIAL TREATMENT FACILITY (CRT)

CONTRACT NO: 16-S-05

(This guaranty shall be executed by the successful bidder in accordance with Article 2.32 of the General Conditions. The bidder may execute the guaranty on this page at the time of submitting his bid.)

GUARANTY

To the Owner: County of Fresno

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after the date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with his obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

ZUMWALT CONSTRUCTION, INC
(Company)

By: _____

PRESIDENT
(Title)

Date: 11/17/16