

# Addendum 4

**Project** Stadium New Press Box – Marlin ISD  
**Issued** December 21<sup>st</sup>, 2023 by CEI Engineering Associates, Inc.  
**Proposal Opening** December 28<sup>th</sup> at 2:00 PM

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The following additions and changes are to be made to the Contract Documents; and hereby become part of the Contract.

## Item 1 – Press Box design Changes

1. Attached addendum 4 materials included with this addendum are to be included as part of addendum 4.

END OF ADDENDUM

This addendum that consists of one (1) addenda sheet; and three (3) HKS narrative sheets; and eleven (17) drawings sheets and one hundred and ten (110) specification sheets, which shall be included as part of the proposal documents.

**This addenda must be acknowledged on the Proposal Form**



2023-12-21

# MARLIN ISD

# PRESSBOX

Marlin, Texas

## ADDENDUM NO. 4

**PROJECT:** Marlin ISD - Pressbox  
HKS Project No. 26095.000

**DATE:** December 21, 2023

**FROM:** Erin Halliday  
**350 N Saint Paul, Suite 100**  
**Dallas, TX 75201**  
**214-969-5599**

The Proposal Documents shall be amended and/or revised by Addendum hereinafter specified and all Work affected by this Addendum shall be included.

Except as may otherwise be described, labor and material for the Work hereinafter indicated shall conform to all requirements of the original Proposal Documents.

### ARCHITECTURE

- **A0.00 – COVER**
  - Updated cover image
- **A0.01 – PROJECT INFORMATION**
  - Updated alternate list
- **A1.00 – SITE PLAN**
  - Added building dimension to existing 50 yd line
  - Added note to clarify civil scope
- **A1.01 – SITE DETAILS**
  - Detail 01: Changed stair detail to show HM door
  - Detail 02: Added note
  - Detail 04: Changed detail to be guardrail in gate
  - Added perforated panel detail connection at stairwell door
- **A2.00 – PRESS BOX FLOOR PLANS**
  - GROUND LEVEL:
    - Added 50 yd line dimension
    - Added EIFS note to be painted

- Added gridline A3
- Added detail A1.01/05 callout
- MEZZANINE LEVEL:
  - Added 50 yd line dimension
  - Added gridline A3
  - Removed perforated panel and supporting columns at the north and west sides of Stair 2S1
- PRESSBOX LEVEL:
  - Added 50 yd line dimension
  - Added gridline A3
- **A2.10 – ROOF PLAN**
  - Added ventilation grille to south wall of elevator pop-up
- **A2.30 – FINISH FLOOR PLANS**
  - Removed floor finish at exterior pre-fab metal stair
- **A3.31 – DOOR, SAFETY GLAZING AND LOUVER INFORMATION**
  - Changed doors 1S1-1, 1S1-2, and 2S1 to be 3'-0" HM doors
- **A3.51 – INTERIOR ELEVATIONS AND DETAILS**
  - Added annotations and dimensions to Elevations 03 and 04
- **A5.00 – EXTERIOR ELEVATIONS**
  - Added steel plate note to North Elevation
- **A6.10 – WALL SECTIONS**
  - Added glazing detail callouts to Section 05
- **A6.11 – WALL SECTIONS**
  - Added glazing detail callouts to Section 06
  - Added detail A7.10/12 and glazing detail callouts to Section 07
- **A7.00 – EXTERIOR DETAILS**
  - Added details 03, 04, and 05
- **A7.10 – METAL PANEL DETAILS 01**
  - Detail 01: Updated metal panel/perf panel connection  
Removed perforated panel and columns at Mezzanine level
  - Detail 02: Removed perforated panel and columns at Mezzanine level
  - Detail 05: Updated metal panel/structural connection  
Added perimeter fire containment system and insulation at Pressbox level
  - Added Detail 12
- **A8.10 – ELEVATOR PLAN AND DETAILS**
  - Detail 09: Added ventilation grille and clarified roof structure at elevator pop-up
  - Detail 13: Added sump pit location for reference

## **STRUCTURAL**

S2.01:

Updated column A.3/2 and associated framing and dimensional control to provide better view for camera platform.

Removed perforated metal panel at plan north and west sides of the mezzanine level.

S4.01

Updated 03 to reflect hi-low removal of perforated panel at plan north and west sides of the mezzanine level.

**END OF ADDENDUM**

# MARLIN ISD PRESS BOX

678 SUCCESS DR B,  
MARLIN, TX 76661



**OWNER**  
MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661-2699

**ARCHITECT**  
HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**  
CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY, SUITE 100  
SUITE 100  
DALLAS, TX 75234

**LANDSCAPE**  
CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY, SUITE 100  
SUITE 100  
DALLAS, TX 75234

**STRUCTURAL**  
HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**MEP ENGINEER**  
ROMINE, ROMINE, & BURGESS, INC.  
300 GREENLEAF ST  
FORT WORTH, TEXAS 76107



## CONSTRUCTION DOCUMENTS

# DRAWING ABBREVIATIONS

<b>A</b>	ANCHOR BOLT AREA DRAIN AIR CONDITIONING ACOUSTICAL CEILING TILE ADDENDUM ADJ AFF AGOR AL ALUM ALT AND APPROX ARCH	<b>N</b>	NOT AVAILABLE NOT IN CONTRACT NOTICE OF ACCEPTANCE FLORIDA GOVERNING AUTHORITY NOMINAL NEAR SIDE NOT TO SCALE NORMAL WEIGHT
<b>B</b>	BENCH MARK BOARD BETW BF BG BL BLDG BLNG BM BOT BR BRG BSMT BU ROO BUR BW	<b>O</b>	OVER ALL ON CENTER OUTSIDE DIAMETER OVERFLOW DRAIN OWNER FURNISHED CONTRACTOR INSTALLED OWNER FURNISHED, INSTALLED OPPOSITE HAND OPPOSITE OUTSIDE FACE OVERFLOW SCUPPER
<b>C</b>	COMPACT PARKING SPACE CARD READER CEM CERAM CORN COP CJ CL CLG CMJ COMM CONC CONN CONST CONT COORD CPE POLYETHYLENE CORRIDOR CR CRS CT CTD CTR CW	<b>P</b>	PLASTIC LAMINATE PRECAST CONCRETE POUNDS PER CUBIC FOOT PORTLAND CEMENT PLASTER PENTHOUSE PROPERTY LINE PLATE PLUMBING PLYWOOD RUBER PLATE POLISHED PORTLAND CEMENT PAIR PREFAB PSF FOOT POUNDS PER SQUARE INCH PT POINT PNEUMATIC TUBE PAINTED
<b>D</b>	DEPTH DEFORMED BAR ANCHOR DIAMETER DIAPHRAGM DIM DJ DL DN DRG DS DWGS DWLS	<b>R</b>	RISER RADIUS RUBBERIZED ASPHALT FLASHING RUBBERIZED ASPHALT MEMBRANE RUBBERIZED ASPHALT UNDERLAYMENT REFLECTED CEILING PLAN ROOF DRAIN REINFORCING BAR RECEP REF REFR OR REFERENCE REINFORCING RELOCATERELOCATED REQUIRED RECESSED FIRE VALVE CABINET ROUGH ROUGH OPENING
<b>E</b>	EACH EACH FACE EFS EJ EL ELEV ELOS EO EQUIP ESC EW EWC EXIST EXP BLT EXT	<b>S</b>	SOUND ATTENUATION BLANKET STANDARD BUILDING SCHEDULE SUPERIMPOSED DEAD LOAD SECT SH SHWR SIM SOG SPA SPEC SQ SS SSF STA STC STD STIFF STR STRUC SYM SYS
<b>F</b>	FLOOR DRAIN FOUNDATION FIRE EXTINGUISHER FIRE EXTINGUISHER CABINET FFHC FIB FIN FLR FS FT FTG FVC	<b>T</b>	TREAD TOP AND BOTTOM TOP OF CURB TELEPHONE TEMP THK TILT TOP OF TOP OF BEAM TOP OF CONCRETE TOP OF FOOTING TOP OF FRAMET TOP OF SLAB TOP OF STEEL TRASH CHUTE TOP OF WALL TYPICAL
<b>G</b>	GAUGE GALV GB GEN GFRC	<b>U</b>	UNDER COUNTER UNDERGROUND UNO UNLESS NOTED
<b>H</b>	HOSE BIB HARDWARE HARDWOOD HOOK HM HOR HP HR HS HSPK HT HW HW	<b>V</b>	VARIES VINYL COMPOSITION TILE VERTICAL VESTIBULE VINYL WALL COVERING VERIFY IN FIELD
<b>I</b>	INTERNATIONAL BUILDING CODE INSIDE DIAMETER INSULATION INTERIOR	<b>W</b>	WITH WHEEL CHAIR WITHOUT WIDTH WATERPROOF(WG) WOOD WIDE FLANGE WIND LOAD WORK POINT WORK POINT - POINT OF ORIGIN WORK POINT - NUMBERED WELDED WIRE FABRIC
<b>J</b>			
<b>K</b>	KIPS (1000 LB) KNOCK-OUT KICKPLATE KIP KSF		
<b>L</b>	ANGLE LAV LNG LL LLH LLV LOC LP LTC LWC		
<b>M</b>	MASONRY MATERIAL MAX MECH MEMB MEP MFG MIO MIN MISC MO MOD MOD BIT MSL MTL		

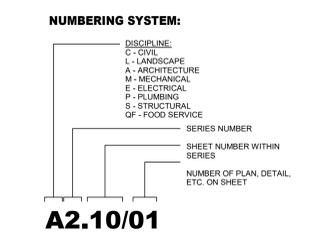
# LEGEND

MATERIALS	SYMBOL	DESCRIPTION
CONCRETE/ PRECAST CONCRETE	[Symbol]	GYPSUM BOARD
SOIL	[Symbol]	EXTERIOR GYPSUM SHEATHING
SAND, EIFS FINISH COAT, OR CEMENT PLASTER	[Symbol]	EXTERIOR CEMENT BOARD
BRICK	[Symbol]	COATED GLASS MAT WATER RESISTANT GYP BD
FIBERGLASS BATT INSULATION	[Symbol]	PLYWOOD
FIBERGLASS SEMI RIGID INSULATION	[Symbol]	COVER BOARD
MINERAL WOOL SEMI RIGID INSULATION	[Symbol]	
EXPANDED POLYSTYRENE RIGID INSULATION	[Symbol]	
EXTRUDED POLYSTYRENE RIGID INSULATION	[Symbol]	
POLYISOCYANURATE RIGID INSULATION	[Symbol]	

ROOM NAME	ROOM NUMBER	PARTITION TYPE WITH NO SOUND ATTENUATION
XXXXX		[Symbol]
EXISTING COLUMN CENTERLINE		[Symbol]
COLUMN CENTERLINE		[Symbol]
ACCESSORY		[Symbol]
DEMOLITION NUMBERED NOTES		[Symbol]
BUILDING WALL SECTION		[Symbol]
ELEVATION		[Symbol]
SECTION DETAIL		[Symbol]
PLAN, BLOW-UP DETAIL		[Symbol]
INTERIOR ELEVATION INDICATOR		[Symbol]
DIRECTION INDICATOR		[Symbol]
EDGE OF SLAB		[Symbol]
FACE OF BUILDING		[Symbol]
CEILING HEIGHT		[Symbol]

CEILING SYMBOLS	DESCRIPTION
[Symbol]	WALL WASHER
[Symbol]	PENDANT TYPE LIGHT FIXTURE
[Symbol]	WALL MOUNTED LIGHT FIXTURE
[Symbol]	DOWNLIGHT
[Symbol]	STRIP LIGHT
[Symbol]	GYP BD CEILING
[Symbol]	SUPPLY AIR
[Symbol]	RETURN AIR
[Symbol]	EXHAUST AIR
[Symbol]	ACCESS PANEL
[Symbol]	LED LIGHT
[Symbol]	LED LIGHT - 1'x4'
[Symbol]	SUSPENDED FLUORESCENT LIGHT

# INDEX OF DRAWINGS



Sheet Number	SHEET NAME	DATE
GENERAL		
A0.00	COVER	X X
A0.01	PROJECT INFORMATION	X X
ARCHITECTURE		
A1.00	SITE PLAN	X X
A1.01	SITE DETAILS	X
A2.00	PRESS BOX FLOOR PLANS	X X
A2.10	ROOF PLAN	X X
A2.30	FINISH FLOOR PLANS	X X
A3.00	PARTITION TYPES	X X
A3.03	PARTITION FRAMING DETAILS	X X
A3.05	PARTITION HEAD DETAILS	X X
A3.10	METAL FABRICATIONS 01	X X
A3.19	ADAMG TOILET LAYOUTS AND STD ACCESSORIES - EDUCATION	X X
A3.31	DOOR, SAFETY GLAZING AND LOUVER INFORMATION	X X
A3.50	CASEWORK DETAILS	X X
A3.51	INTERIOR ELEVATIONS AND DETAILS	X X
A4.00	REFLECTED CEILING PLAN	X X
A5.00	EXTERIOR ELEVATIONS	X X
A6.00	BUILDING SECTIONS	X X
A6.10	WALL SECTIONS	X X
A6.11	WALL SECTIONS	X X
A7.00	EXTERIOR DETAILS	X X
A7.10	METAL PANEL DETAILS 01	X X
A7.11	METAL PANEL DETAILS 02	X X
A7.20	SINGLE PLY ROOFING DETAILS 01	X X
A7.21	SINGLE PLY ROOFING DETAILS 02	X X
A8.00	STEEL STAIR PLANS AND SECTIONS	X X
A8.02	STAIR DETAILS	X X
A8.10	ELEVATOR PLAN AND DETAILS	X X
STRUCTURAL		
S1.01	GENERAL NOTES	X X
S1.02	SPECIAL INSPECTION TABLES	X X
S1.03	TYPICAL DETAILS	X
S1.04	TYPICAL DETAILS	X
S1.05	TYPICAL DETAILS	X
S1.06	TYPICAL DETAILS	X
S2.01	FRAMING PLAN	X X
S3.01	SECTIONS AND DETAILS	X
S4.01	SECTIONS AND DETAILS	X X
S4.02	SECTIONS AND DETAILS	X X
S4.03	SECTIONS AND DETAILS	X
MECHANICAL		
M1.01	MECHANICAL SCHEDULE	X X
M2.01	PRESS BOX FLOOR PLANS - H.V.A.C.	X X
M3.01	ROOF PLAN - H.V.A.C.	X X
ELECTRICAL		
E1.01	ELECTRICAL SCHEDULES, SYMBOL LEGENDS & DETAILS	X X
E1.02	ELECTRICAL DETAILS	X X
E1.03	LIGHTING CONTROL DETAILS AND SYMBOL LEGEND	X X
E2.01	PRESS BOX FLOOR PLANS - POWER	X X
E3.01	PRESS BOX FLOOR PLANS - LIGHTING	X X
E4.01	FIRE ALARM DETAILS AND NOTES	X
E4.02	PRESS BOX FLOOR PLANS - FIRE ALARM	X
E5.01	PRESS BOX FLOOR PLANS - TECHNOLOGY SUPPORT	X
E6.01	ELECTRICAL SITE PLAN - NEW WORK	X
PLUMBING		
P1.01	PLUMBING SCHEDULES, SYMBOLS & DETAILS	X X
P2.01	PRESS BOX FLOOR PLANS - PLUMBING	X X
P3.01	ROOF PLAN - PLUMBING	X X

# VICINITY MAP



LABEL	ALTERNATE #	ALTERNATE INFORMATION
EXTERIOR		
MTL-01	1	TYPE: 78" CORRUGATED ALUMINUM METAL WALL PANEL MANUF: M8C1 COLOR: REF ELEVATION SIZE: EXT WALL
MTL-02	1	DEDUCT ALT TYPE: CHAIN LINK FENCE INSTALL: BY VENDOR
MTL-02	2	ADD ALT TYPE: PERFORATED WALL SCREEN MANUF: BOB MODERN COLOR: COR - TEN SIZE: 4'x8' INSTALL: BY VENDOR
INTERIOR		
PL01	1	DEDUCT ALT FOR S5F01 TYPE: FORMICA MANUF: CORIAN COLOR: MOUSE MATTE SIZE: REF DRAWINGS INSTALL: BY VENDOR
VCT	1	DEDUCT ALT FOR QP71 TYPE: VCT JOHNSONITE MANUF: MCHAWK COLOR: STY CLOUDY SIZE: 4'x8' INSTALL: BY VENDOR

# BUILDING SUMMARY

**PROJECT INFORMATION**

PROJECT NAME: MARLIN ISD PRESS BOX  
 ADDRESS: 678 SUCCESS DR B  
 OWNER-CONTACT PERSON: MARLIN INDEPENDENT SCHOOL DISTRICT  
 PHONE:

**APPLICABLE CODES**

Building Code: 2018 International Building Code  
 Mechanical Code: 2018 International Mechanical Code  
 Electrical Code: 2017 National Electrical Code  
 Plumbing Code: 2018 International Plumbing Code  
 Fire Code: 2018 International Fire Code  
 Accessibility Code: 2012 Texas Accessibility Standards  
 Energy Code: 2018 International Energy Conservation Code

**BUILDING PLANNING**

OCCUPANCY: BUSINESS, B AND ASSEMBLY - A  
 MIXED OCCUPANCY? (YES) NO  
 REQUIRED FIRE SEPARATION, NO  
 ESSENTIAL FACILITY? (YES) NO  
 RISK CATEGORY: II

**TYPE OF CONSTRUCTION**

CONSTRUCTION TYPE: TYPE II-B, NON-SPRINKLERED  
 FIRE SPRINKLER: NA  
 ALLOWABLE BUILDING AREA: 14,500

**GENERAL BUILDING LIMITATIONS**

ITEM	ALLOWED / REQUIRED	ACTUAL / PROVIDED
HEIGHT OF BUILDING	59	48' 10"
NUMBER OF STORIES	3	2
MAX SINGLE FLOOR AREA	14,500	3,100
TOTAL AREA OF BUILDING	43,500	6,500

**FIRE PROTECTION SYSTEMS**

- FIRE EXTINGUISHING SYSTEM: YES / (X)  
 - TYPE: NA  
 - STANDPIPE SYSTEM: YES / (X)  
 - CLASS: NA  
 - SMOKE CONTROL: YES / (X)



**ARCHITECT**  
 HKS, INC.  
 350 N SAINT PAUL ST  
 SUITE 100  
 DALLAS, TX 75201

**CIVIL ENGINEER**  
 CEI ENGINEERING ASSOCIATES, INC.  
 3030 LBJ FREEWAY  
 SUITE 100  
 DALLAS, TX 75234

**LANDSCAPE**  
 CEI ENGINEERING ASSOCIATES, INC.  
 3030 LBJ FREEWAY  
 SUITE 100  
 DALLAS, TX 75234

**STRUCTURAL**  
 HKS, INC.  
 350 N SAINT PAUL ST  
 SUITE 100  
 DALLAS, TX 75201

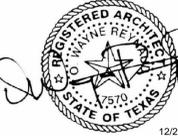
**MEP**  
 ROMINE, ROMINE & BURGESS, INC.  
 300 GREENLEAF ST  
 FORT WORTH, TX 76107



**MARLIN**

**MARLIN ISD PRESS BOX**  
**678 SUCCESS DR B**  
**MARLIN, TX 76661**

**OWNER**  
 MARLIN ISD  
 678 SUCCESS DR B  
 MARLIN, TX 76661



12/21/2023

REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
2	ADDENDUM #4	12/21/2023

HKS PROJECT NUMBER  
**26095.000**  
 DATE  
**11/20/2023**  
 ISSUE  
**ISSUE FOR BID AND PERMIT**  
 SHEET TITLE  
**PROJECT INFORMATION**

SHEET NO.  
**A0.01**

**ARCHITECT**

HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**

CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**LANDSCAPE**

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3030 LBJ FREEWAY  
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**MEP**

ROMINE, ROMINE & BURGESS, INC.  
300 GREENLEAF ST  
FORT WORTH, TX 76107



# MARLIN

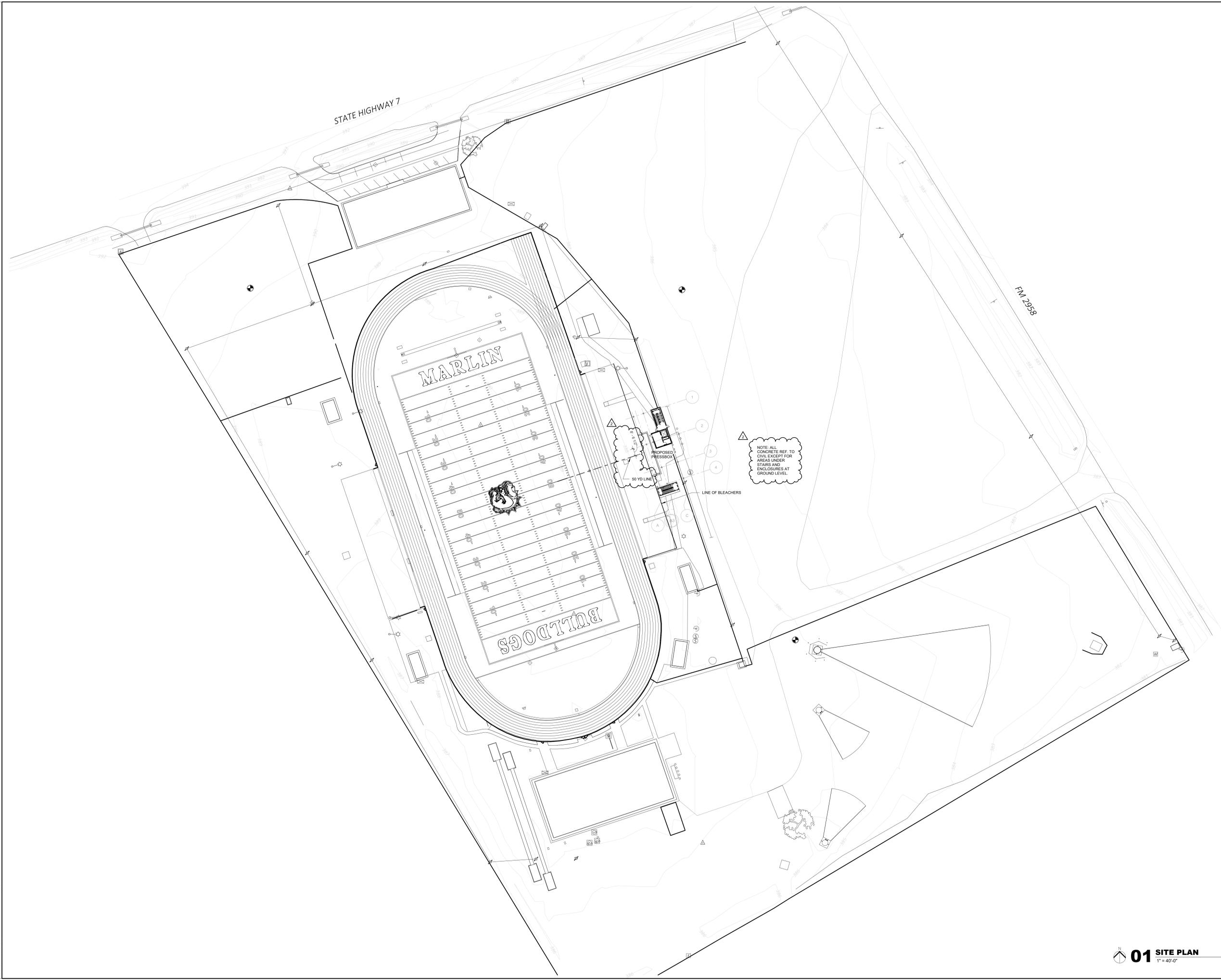
**MARLIN ISD PRESS BOX  
678 SUCCESS DR B  
MARLIN, TX 76661**

**OWNER**

MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661



12/21/2023



NOTE: ALL  
CONCRETE REF. TO  
CIVIL EXCEPT FOR  
AREAS UNDER  
STAIRS AND  
ENCLOSURES AT  
GROUND LEVEL.

**01 SITE PLAN**  
1" = 40'-0"

PLOT DATE: 12/21/2023 10:38:40 AM TEMPLATE VERSION: 210.4

REVISION NO.	DESCRIPTION	DATE
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HKS PROJECT NUMBER  
**26095.000**  
DATE  
**11/20/23**  
ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**SITE PLAN**

SHEET NO.  
**A1.00**

**ARCHITECT**

HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**

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**MARLIN**

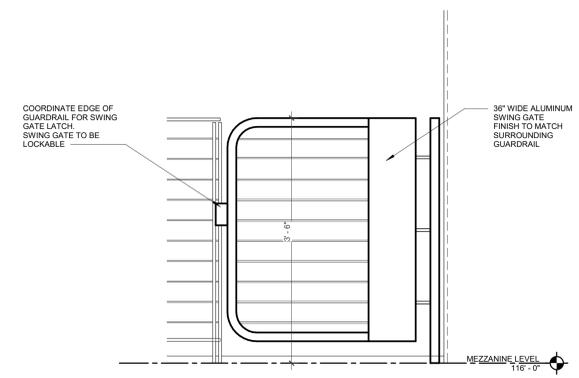
**MARLIN ISD PRESS BOX  
678 SUCCESS DR B  
MARLIN, TX 76661**

**OWNER**

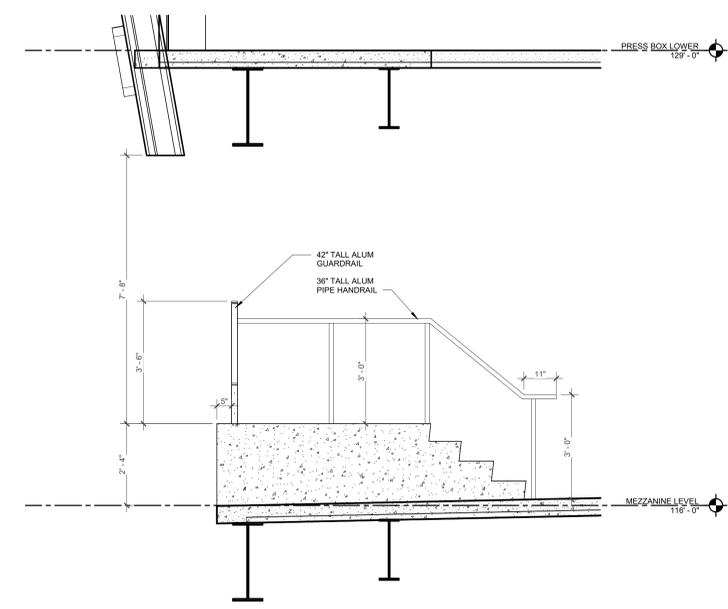
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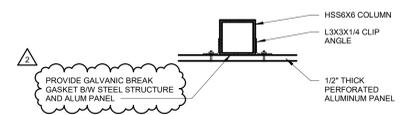
12/21/2023



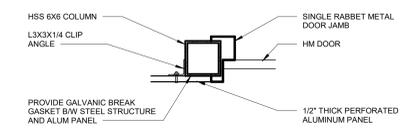
**04 PIPE SWING GATE**  
1/2" = 1'-0"



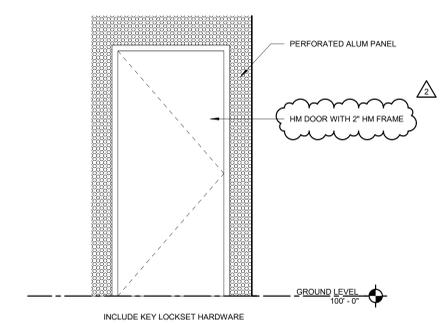
**03 MEZZANINE PLATFORM**  
1/2" = 1'-0"



**02 PERFORATED PANEL CONNECTION**  
1/2" = 1'-0"



**05 PERFORATED PANEL CONNECTION @ DOOR**  
1/2" = 1'-0"



**01 HM STAIRWELL DOOR ELEVATION**  
1/2" = 1'-0"

REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
2	ADDENDUM #4	12/21/2023

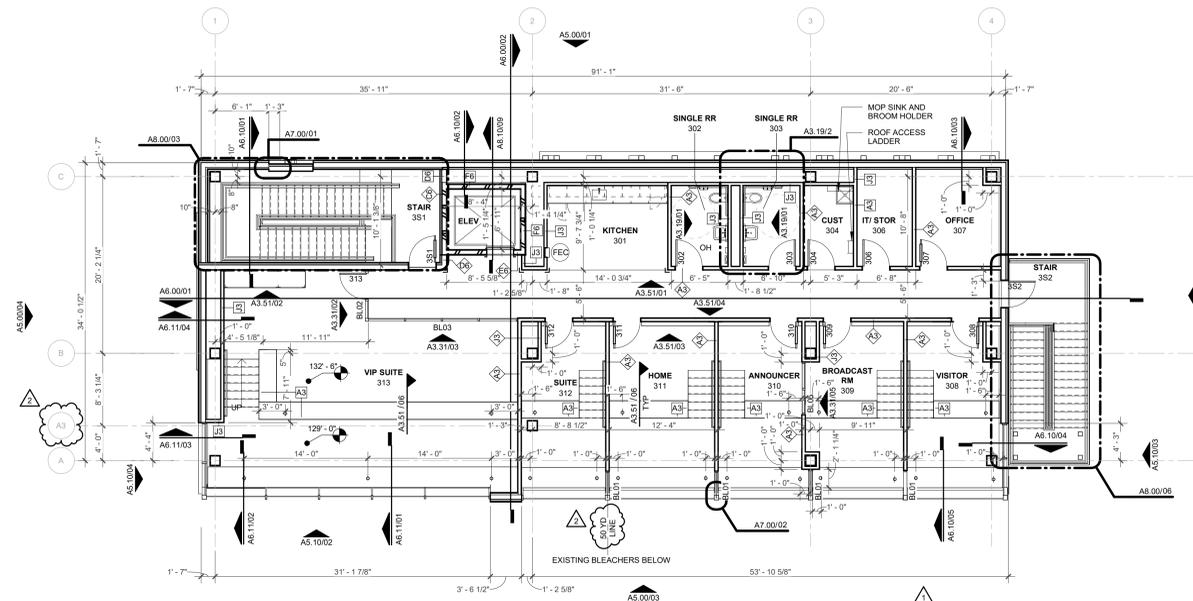
HKS PROJECT NUMBER  
**26095.000**  
DATE  
**11/20/23**  
ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**SITE DETAILS**

SHEET NO.  
**A1.01**

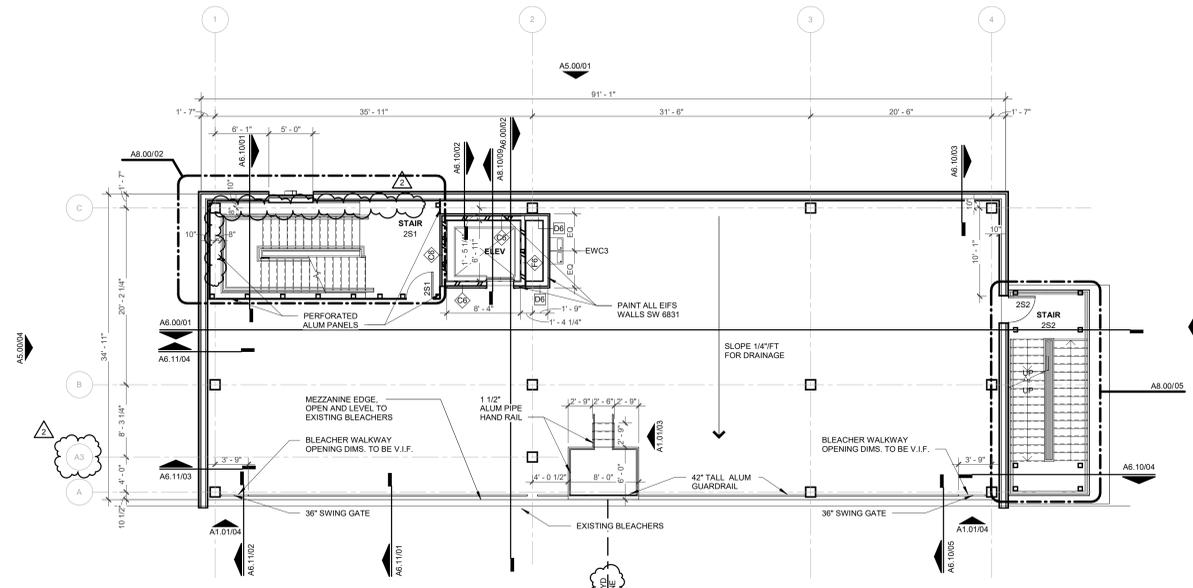


**GENERAL NOTES - FLOOR PLAN**

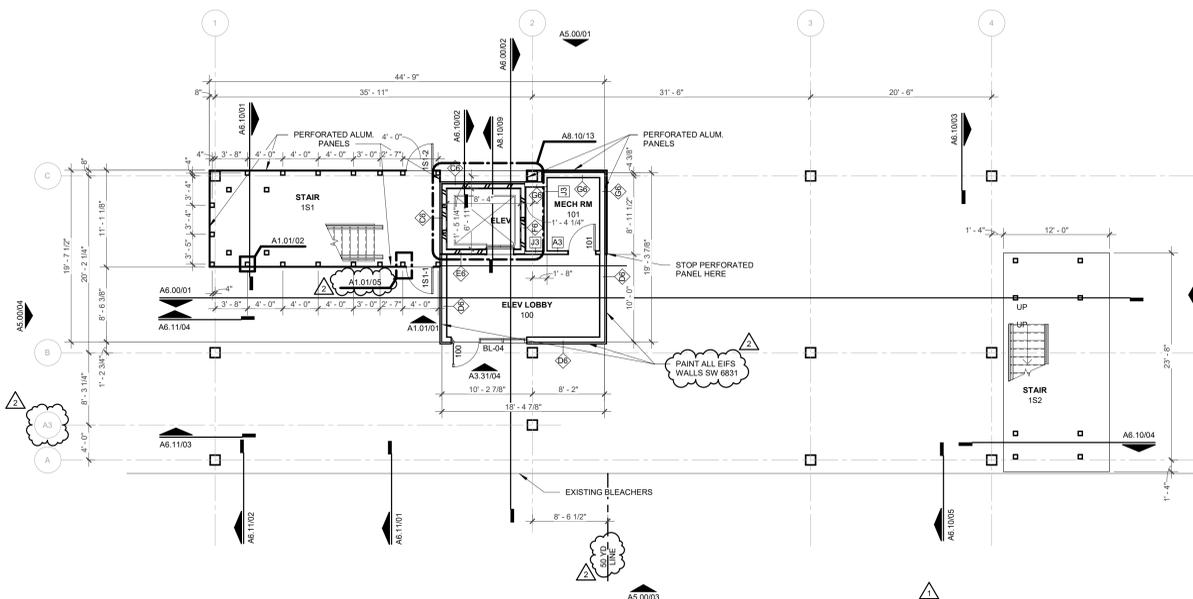
1. REFER TO SHEETS A3.00, A3.01, A3.05 FOR PARTITION TYPES, GRAPHIC AND SYMBOLIC DESIGNATIONS, NOTES, AND DETAILS.
2. REFER TO SHEET A3.10 FOR MISCELLANEOUS METAL FABRICATION (MF) TYPES AND DETAILS.
3. REFER TO SHEET A.3.19 FOR TYPICAL TOILET LAYOUTS AND TOILET ACCESSORY MOUNTING DIAGRAMS.
4. REFER TO SHEET A3.31 FOR DOOR INFORMATION, SCHEDULES AND DETAILS.
5. REFER TO SHEET A2.30 FOR FINISH INFORMATION AND SCHEDULES.
6. REFER TO SHEET A3.50 FOR CASEWORK DETAILS AND INFORMATION.
7. REFER TO SHEET A5.00 FOR EXTERIOR ELEVATIONS.
8. REFER TO SHEET A8.00, A8.02 FOR STAIR AND ELEVATOR SECTIONS AND DETAILS.
9. ALL EXTERIOR DIMENSIONS ARE FROM FACE OF EXTERIOR FACE OF STUD, U.N.O.



**03 PRESSBOX LEVEL**  
1/8" = 1'-0"



**02 MEZZANINE LEVEL**  
1/8" = 1'-0"



**01 GROUND LEVEL**  
1/8" = 1'-0"

NO.	DESCRIPTION	DATE
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2	ADDENDUM #4	12/21/2023

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ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**PRESS BOX FLOOR PLANS**

SHEET NO.

**A2.00**

**ARCHITECT**

HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
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**CIVIL ENGINEER**

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HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**MEP**

ROMINE, ROMINE & BURGESS, INC.  
300 GREENLEAF ST  
FORT WORTH, TX 76107



# MARLIN

**MARLIN ISD PRESS BOX**  
**678 SUCCESS DR B**  
**MARLIN, TX 76661**

**OWNER**

MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661



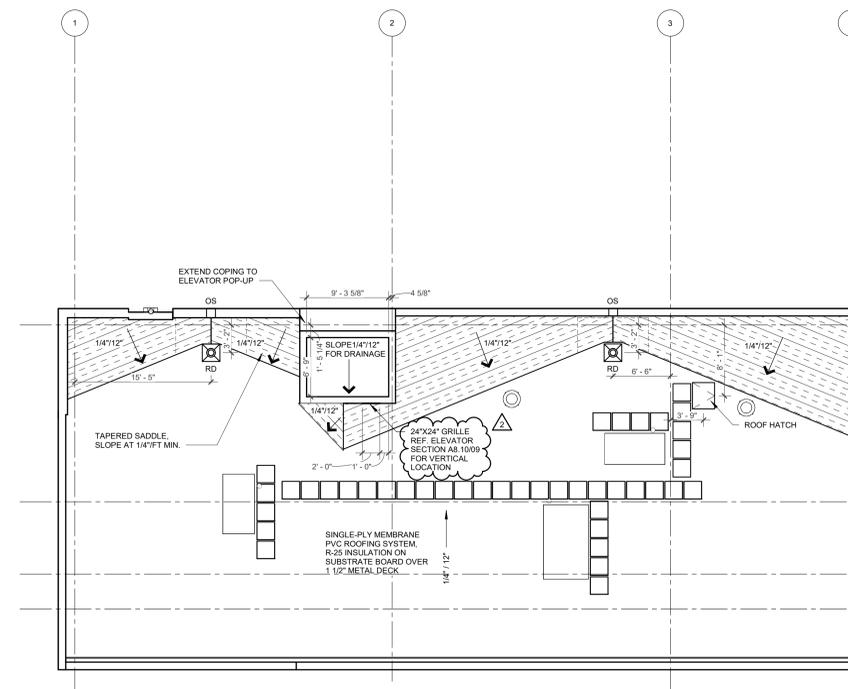
12/21/2023

**GENERAL NOTES - ROOF PLAN**

- ROOF TYPE: SINGLE-PLY MEMBRANE PVC ROOFING SYSTEM - R-25 INSULATION.
- ALL ROOFING SURFACES TO SLOPE 1/4" VERTICAL PER 1'-0" HORIZONTAL MINIMUM, UNLESS NOTED OTHERWISE.
- HATCHING INDICATES AREAS WHERE THE ROOF SURFACE SLOPE IS ACHIEVED WITH TAPERED INSULATION. THE ROOF SURFACE SLOPE IN AREAS WITHOUT HATCHING IS ACHIEVED WITH SLOPING STRUCTURE.
- TOP OF INSULATION HEIGHTS, HIGH POINTS AND LOW POINTS, ARE INDICATED AS THE TOP OF ROOF SURFACE ABOVE THE ROOF DRAINS, (I.E. ± 3.5' WHERE HIGH POINT OF ROOF DRAIN SLUMP IS +0').
- ALL ROOF TOP MECHANICAL, ELECTRICAL, AND/OR PLUMBING EQUIPMENT SHOWN FOR INFORMATION ONLY. REFERENCE MECHANICAL, ELECTRICAL AND PLUMBING DOCUMENTS AND SPECIFICATIONS FOR SPECIFIC DESIGN INFORMATION.
- PROVIDE WALKWAY PROTECTION TO MAJOR MECHANICAL, ELECTRICAL, AND PLUMBING EQUIPMENT AS REQUIRED TO PROVIDE SERVICE ACCESS. WALKWAY PROTECTION IS INDICATED AS A GENERAL LAYOUT AND MAY NOT SHOW ALL FINAL LOCATIONS OF ALL EQUIPMENT.
- WALKWAY PROTECTION IS INDICATED AS A GENERAL LAYOUT AND MAY NOT SHOW ALL FINAL LOCATIONS OF ALL EQUIPMENT.

**ROOF PLAN LEGEND**

- ROOF DRAIN - REFER PLUMBING DOCUMENTS FOR DRAIN SIZING
- OVERFLOW ROOF SCUPPER - SCUPPER SIZE TO BE 4" T X 8" W
- OVERFLOW ROOF SCUPPER - SCUPPER SIZE TO BE 4" T X 8" W
- WALKWAY PROTECTION PADS, SHOWN FOR GENERAL LOCATION ONLY - COORDINATE WITH EQUIPMENT
- ROOFTOP MECHANICAL EQUIPMENT



**01 ROOF PLAN**  
1/8" = 1'-0"

REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
2	ADDENDUM #4	12/21/2023

HKS PROJECT NUMBER

**26095.000**

DATE

**11/20/23**

ISSUE

**ISSUE FOR BID AND**

**PERMIT**

**ROOF PLAN**

SHEET NO.

**A2.10**

REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
2	ADDENDUM #4	12/21/2023

HKS PROJECT NUMBER  
**26095.000**

DATE  
**11/20/23**

ISSUE  
**ISSUE FOR BID AND PERMIT**

SHEET TITLE  
**FINISH FLOOR PLANS**

SHEET NO.  
**A2.30**

### INTERIOR DESIGN SELECTION SUMMARY

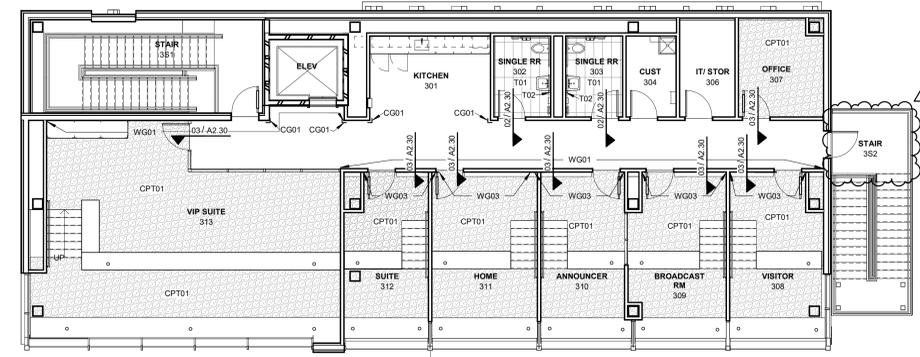
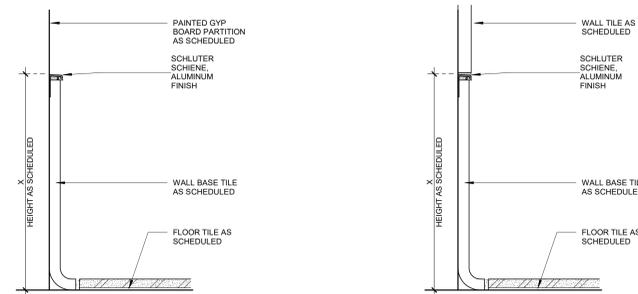
SPEC	CODE	MANUFACTURER	STYLE	COLOR	SIZE	COMMENTS	REV.	REP.
	VCT01	JOHNSONITE	CLOUDY 572					
						ADD DEDUC - REPLACE CPT01 WITH VCT01		
<b>ACOUSTICAL CEILING TILE</b>								
095113	ACT01	ARMSTRONG	FINE FISSURED 1728, 5/8" THICK, SQUARE LAY-IN 15/16"	WHITE	24"X24"	15/16" GRID		CORRIDOR
<b>CARPET TILE</b>								
096813	CPT01	MOHAWK	SIDE STRIPE GT419					SPECIFY INSTALLATION METHOD
<b>INTERIOR PAINT</b>								
099100	IP101	SHERWIN WILLIAMS	SW 7005 PURE WHITE, SATIN	WHITE				FIELD WALL PAINT
	IP102	SHERWIN WILLIAMS	SW 7757 HIGH REFLECTIVE WHITE, FLAT	WHITE				CEILING PAINT
	IP103	SHERWIN WILLIAMS	SW 7099 ROCK ORE, SEMI-GLOSS	DARK BROWN/BLACK				DOOR FRAME
	IP104	SHERWIN WILLIAMS	SW 6832 IMPULSIVE PURPLE	PURPLE				FIELD WALL PAINT
	IP105	SHERWIN WILLIAMS	SW 6829 MAGICAL	PURPLE				FIELD WALL PAINT
	IP106	SHERWIN WILLIAMS	SW 6902 DECISIVE YELLOW	YELLOW				FIELD WALL PAINT
<b>PLASTIC LAMINATE</b>								
064023	PL01	FORMICA	928	MOUSE				ADD DEDUCT - REPLACE SSF01 COUNTER TOPS WITH PL01
064023	PL02	FORMICA	918	NEUTRAL WHITE				
<b>RESILIENT BASE</b>								
096513	RB01	TARKETT	BASEWORKS THERMOSET RUBBER TYPE TS	63 BURNT LUMBER B	4" X 1/8" THICK			SPECIFY THE PROFILE
<b>ROLLER WINDOW SHADES</b>								
122413	RS01	SWF CONTRACT	STANDARD MOTORIZED SOLAR SHADES, CEILING RECESSED					
<b>SEALED CONCRETE</b>								
033500	SC01	JARDEX						
<b>SOLID SURFACE FABRICATIONS</b>								
122961	SSF01	CORIAN	DOVE	GRAY				
<b>TILING</b>								
095000	T01	DALTILE	VOLUME 1.0 AMPLIFY BLACK VL70	GREY	12X24			
095000	T02	PANTHEON	VVA 610-106 910-106	GREY	4 x 12			
	T03	DALTILE	VOLUME 1.0 AMPLIFY BLACK VL70 COVE BASE	GREY	6X12			

### INTERIOR FINISH GENERAL NOTES

- PATTERN NAME, COLOR AND NUMBER FOR EACH MATERIAL ARE GIVEN WHEREVER POSSIBLE ON THE FINISH PLAN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/DESIGNER SO THAT THE CORRECT MATERIAL IS INSTALLED.
- REFERENCE A2.30 FOR INTERIOR DESIGN SELECTIONS FOR FINISH SELECTIONS, FLOORINGS TRANSITION DETAILS.
- REFERENCE A2 SERIES DRAWINGS FOR INTERIOR FINISH PLANS.
- REFERENCE A3.5X SERIES FOR CASEWORK FINISHES.
- REFERENCE A3 SERIES FOR INTERIOR ELEVATIONS.
- REFERENCE A4 SERIES FOR ALL CEILING FINISHES.
- PAINT VERTICAL AND HORIZONTAL SURFACES OF FURR DOWNS TO MATCH ADJACENT WALL COLOR U.N.O.
- PAINT ACCESS PANELS LOCATED WITHIN GYPSUM BOARD WALLS OR CEILINGS THE ADJACENT WALL COLOR.
- DRYWALL TO RECEIVE A LEVEL FIVE (5) FINISH IN AREAS TO RECEIVE DARK COLOR PAINTS AND WALLCOVERING ALL DARKER PAINT COLORS TO RECEIVE TWO COATS OF PAINT MINIMUM.
- TILE AND/OR FLOORING SHALL NOT CUT LESS THAN 1/2" OF THE MATERIAL UNLESS IT IS GREATER THAN 8 INCHES.
- ALL FLOORING TRANSITIONS SHALL BE CENTERED UNDER THE DOOR IN THE CLOSED POSITION.
- PROVIDE A CONTROL JOINT IN GYP B/D AT LOCATIONS WHERE WALL MATERIAL AND PAINT COLOR CHANGES.
- ALL FLOORING TO BE INSTALLED PARALLEL TO DOOR UNLESS NOTED OTHERWISE.
- BULHEAD/SOFFIT/FURROWS SHOULD BE FINISHED WITH THE SAME MATERIAL AND OR COLOR ON ALL FACES AS SPECIFIED, UNLESS SPECIFICALLY NOTED OTHERWISE.
- PROVIDE WINDOW TREATMENTS (RS01) AT ALL EXTERIOR GLAZING, U.N.O.
- TILE BASE IN RESTROOM IS TO3 U.N.O.

### INTERIOR TYPICAL FINISHES U.N.O

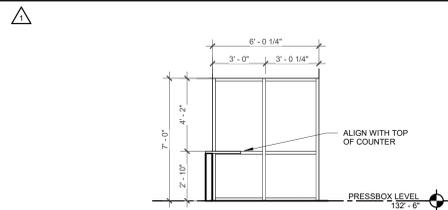
ACT01	ACOUSTIC CEILING TILE
IP101	WALL PAINT
IP102	CEILING + SOFFITS
RB01	WALL BASE
RS01	FIELD FLOORING
IP103	DOOR + WINDOW FRAMES
WD01	INTERIOR DOORS
PL02	CABINETS
SSF01	COUNTERTOPS
IP101	RESTROOM WALLS
T01	RESTROOM FLOORING & WALL BASE



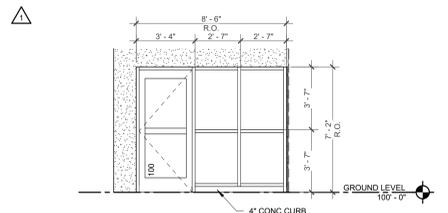
### 01 FINISH PLAN - PRESSBOX LEVEL

1/8" = 1'-0"

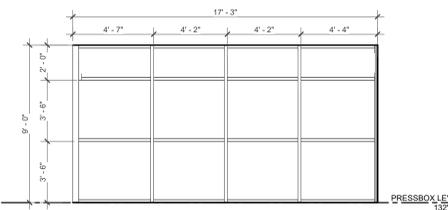
**BORROWED LITES / SLIDING PASS WINDOWS**



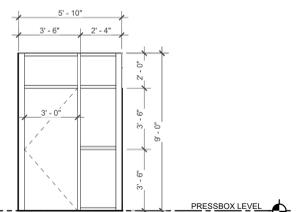
**05 BL-05 - ANNOUNCER/BROADCAST**  
1/4" = 1'-0"



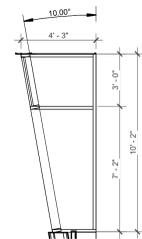
**04 BL-04 - ELEVATOR LOBBY**  
1/4" = 1'-0"



**03 BL03 - VIP SUITE**  
1/4" = 1'-0"



**02 BL02 - VIP SUITE**  
1/4" = 1'-0"



**01 BL01 - SUITE**  
1/4" = 1'-0"

**SAFETY GLASS LOCATIONS**

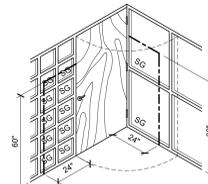
NOTE: NOT ALL CONDITIONS SHOWN BELOW ARE APPLICABLE TO THE SCOPE OF WORK.

**GLASS SCHEDULE**

GLASS PRODUCT SCHEDULE FOR WALLS AND DOORS		ANNEALED	WIRED	TEMPERED	LAMINATED	FIRE-RATED
NP - NOT PERMITTED	* - NOT ALLOWED AT SHOWER ENCLOSURES					
A - ACCEPTABLE						
NR - NOT RECOMMENDED						
FIRE-RATED	SAFETY NOT REQUIRED	NP	NP	NP	NP	A
	SAFETY REQUIRED	A	A	A	A	NR
NON-FIRE-RATED	SAFETY NOT REQUIRED	NP	NP	*	A	NR
	SAFETY REQUIRED	NP	NP	*	A	NR

**SAFETY GLAZING (SG) IS REQUIRED FOR**

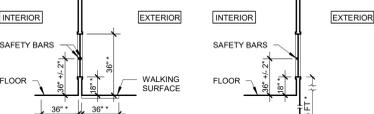
**CLOSE PROXIMITY TO DOORS**



**GLAZED OPENINGS IN DOORS**



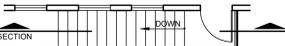
**GLAZED OPENINGS IN PARTITIONS**



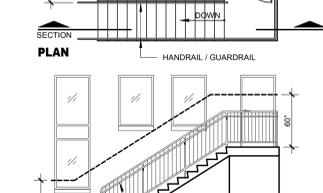
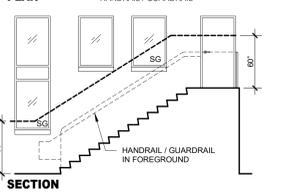
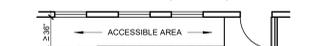
SAFETY GLASS IS REQUIRED WHEN ALL OF THE FOLLOWING CONDITIONS ARE PRESENT:  
 \* TOP OF GLAZING IS GREATER THAN / EQUAL 96" AFF  
 \* AREA OF SINGLE PANE > 9 SF  
 \* BOTTOM OF GLAZING IS LESS THAN / EQUAL 18" AFF  
 \* WALKING SURFACE IS LOCATED WITHIN 36" OF ONE OR BOTH SIDES  
 EXCEPTION: GLASS DOES NOT NEED TO BE SAFETY GLASS WHEN 1/2" SAFETY BAR IS INSTALLED WHERE WALKING SURFACE IS WITHIN 36" OF GLASS

SAFETY GLASS IS REQUIRED AT INTERIOR LITE WHEN BOTTOM OF GLAZING IS LESS THAN / EQUAL 18" AFF  
 EXCEPTION: INTERIOR LITE DOES NOT NEED TO BE SAFETY GLASS WHEN 1/2" SAFETY BAR IS INSTALLED ABOVE GRADE  
 SAFETY GLASS IS REQUIRED FOR EXTERIOR LITE EXCEPT WHEN THE BOTTOM OF THE GLAZING IS GREATER THAN / EQUAL 25 FT ABOVE GRADE

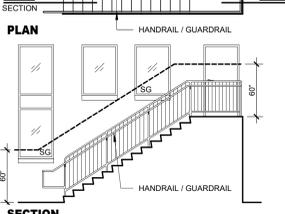
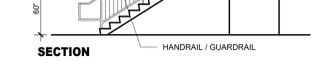
**STAIRWAY (OR RAMP) AGAINST BUILDING**



**STAIRWAY (OR RAMP) WITH ACCESSIBLE AREA OF 36" OR MORE BETWEEN STAIR (OR RAMP) AND BUILDING**

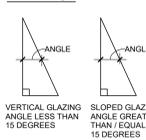


**STAIRWAY (OR RAMP) WITHIN 18" OR LESS FROM BUILDING**



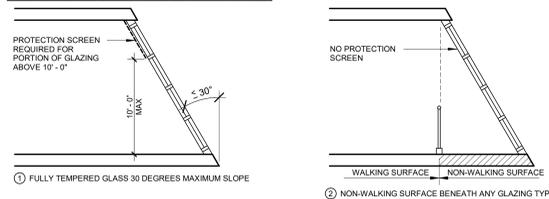
**SLOPED SAFETY GLASS LOCATIONS**

**DEFINITION**



GLAZING TYPE	PERMITTED WITHOUT REQUIRED PROTECTION SCREEN	PERMITTED WITH REQUIRED PROTECTION SCREEN	EXCEPTIONS TO SCREEN REQUIREMENTS
ANNEALED GLASS	NP	NP	① ②
HEAT STRENGTHENED GLASS	NP	OK	② ③
FULLY TEMPERED GLASS	NP	OK	① ② ③ ④
WIRE GLASS	OK	NA	
LAMINATED GLASS	OK	NA	
PLASTIC GLAZING	OK	NA	
LABELLED UNIT SKYLIGHTS	OK	NA	

**EXCEPTIONS TO SCREENING REQUIREMENTS**

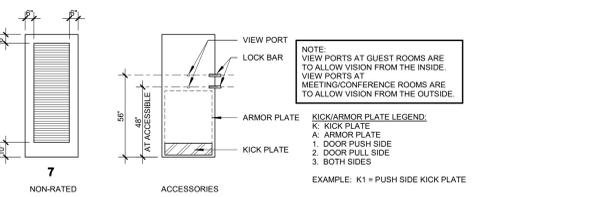
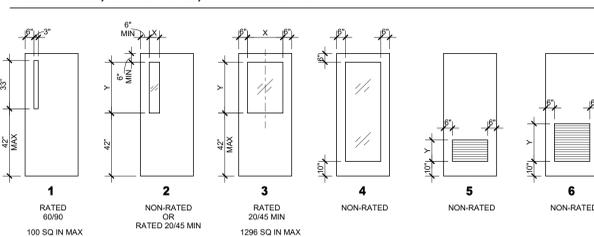


**DOOR LEGEND**

**DOOR NOTES**

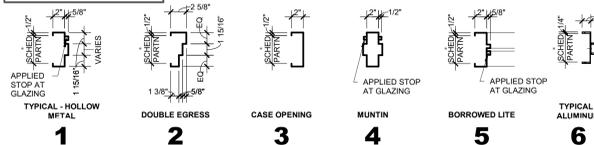
1. CONTRACTORS TO USE THE ARCHITECT'S FLOOR PLAN DESIGNATION DOOR NUMBER IN ADDITION TO THE ROOM NUMBER ON ALL SHOP DRAWING SCHEDULE SUBMITTALS.

**VISION PANELS, LOUVER TYPES, AND ACCESSORIES**

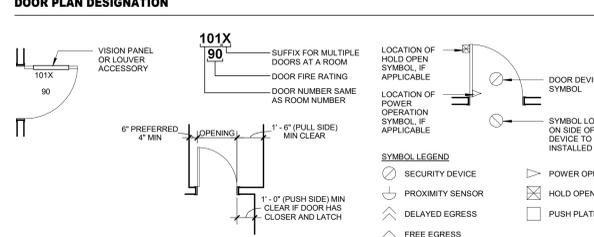


**DOOR AND BORROWED LITE FRAME TYPES**

\* WHERE STRAPPING DETAILS 04 & 05B FROM SHEET AS 03 ARE UTILIZED, ADD 1/8" TO SCHEDULED PARTITION WIDTH - NOT REQUIRED IF KING STUDS ARE USED.



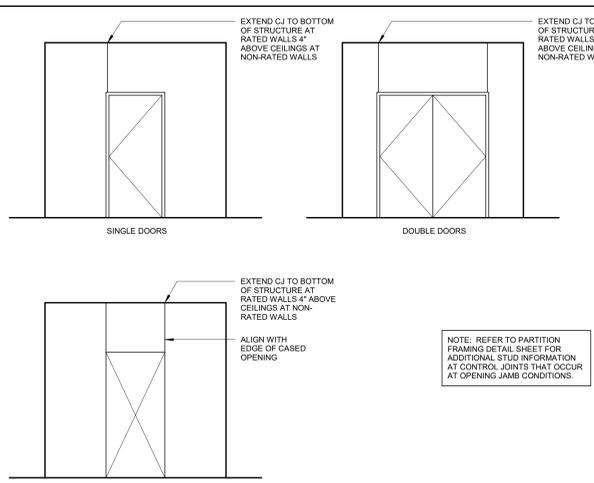
**DOOR PLAN DESIGNATION**



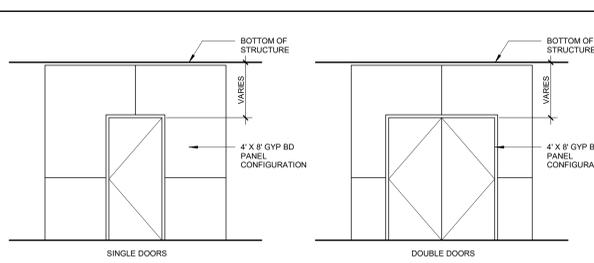
**DOOR OPENING LOCATION**

A. DOORS SHOWN ADJACENT TO A FLANKING WALL OR OTHER FIXED OBSTRUCTION, SHALL BE LOCATED AS SHOWN ABOVE.  
 B. OTHER LOCATIONS SHALL BE ON CENTERLINE OF ROOM OR AS SPECIFICALLY DIMENSIONED.

**CONTROL JOINT AT DOOR FRAMES**



**GYPSUM BD CONFIGURATION AT DOORS**



**DOOR LEGEND**

**DOOR NOTES**

1. CONTRACTORS TO USE THE ARCHITECT'S FLOOR PLAN DESIGNATION DOOR NUMBER IN ADDITION TO THE ROOM NUMBER ON ALL SHOP DRAWING SCHEDULE DRAWING SCHEDULE SUBMITTALS.

**DOOR TYPES**



**DOOR SCHEDULE**

REVISION	DOOR NUMBER	ROOM NAME	WIDTH	HEIGHT	DOOR TYPE	FRAME TYPE	DOOR MATERIAL	FRAME MATERIAL	DOOR RATING	VISION PANEL & LOUVER TYPE	HARDWARE	COMMENTS
	GROUND LEVEL											
	151-1	STAIR	3'-0"	7'-0"	A1	1	HM	HM	-	-	SET #1	REF A1 01 FOR DETAILS
	151-2	STAIR	3'-0"	7'-0"	A1	1	HM	HM	-	-	SET #1	REF A1 01 FOR DETAILS
	100	ELEV LOBBY	3'-0"	7'-0"	C1	5	WD	HM	-	-	SET #2	REF A1 01 FOR DETAILS
	101	MECH RM	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #2	
	MEZZANINE LEVEL											
	251	STAIR	3'-0"	7'-0"	A1	1	HM	HM	-	-	SET #1	REF A1 01 FOR DETAILS
	252	STAIR	3'-0"	7'-0"	A1	1	HM	HM	-	-	SET #1	
	PRESSBOX LEVEL											
	351	STAIR	3'-0"	7'-0"	A1	1	HM	HM	-	-	SET #1	
	352	STAIR	3'-0"	7'-0"	A1	1	HM	HM	-	-	SET #1	
	302	SINGLE RR	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #4	
	303	SINGLE RR	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #4	
	304	CURT	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #5	
	306	IT/STOR	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #3	
	307	OFFICE	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #6	
	308	VISITOR	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #7	
	309	BROADCAST RM	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #7	
	310	ANNOUNCER	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #7	
	311	HOME	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #7	
	312	SUITE	3'-0"	7'-0"	A1	1	WD	HM	-	-	SET #7	
	313	VIP SUITE	3'-0"	7'-0"	A1	5	WD	HM	-	-	SET #7	

**DOOR HARDWARE SCHEDULE**

MATCH OWNER STANDARDS	SET #1: INTERIOR STAIR	SET #2: EXTERIOR MECH ROOM	SET #3: STORAGE ROOM AND IT	SET #4: RESTROOMS	SET #5: CUSTODIAL	SET #6: OFFICE	SET #7: SUITES	SET #8: ELEVATOR LOBBY	
	3 HINGES 1 CLOSER WITH STOP 1 KEY LOCK 1 DOOR SWEEP 1 THRESHOLD 1 SILENCER 1 EXIT DEVICE	1 CONTINUOUS HINGE 1 CLOSER WITH STOP 1 KEY LOCK 1 KICK PLATE 1 DOOR SWEEP 1 THRESHOLD	3 HINGES 1 WALL BUMPER 1 CLOSER 1 STOREROOM LOCKSET 1 KICKPLATE 1 SET OF SEALS	3 HINGES 1 PRIVACY SET 1 CLOSER 1 WALL BUMPER 1 GASKETING	3 HINGES 1 STOREROOM LOCKSET 1 CLOSER WITH STOP 1 KICKPLATE 1 SET OF SEALS	3 HINGES 1 KEY LOCK 1 CLOSER WITH STOP 1 SET OF SEALS	4 HINGES 1 CLOSER 1 WALL BUMPER	3 HINGES 1 CLOSER W/ STOP 1 DOOR SWEEP 1 THRESHOLD 1 KEY LOCK	3 HINGES 1 CLOSER W/ STOP 1 DOOR SWEEP 1 THRESHOLD 1 KEY LOCK



**ARCHITECT**  
HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**  
CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**LANDSCAPE**  
CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
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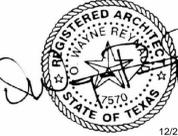
**STRUCTURAL**  
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REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
2	ADDENDUM #4	12/21/2023

HKS PROJECT NUMBER  
**26095.000**

DATE  
**11/20/23**

ISSUE  
**ISSUE FOR BID AND PERMIT**

SHEET TITLE  
**DOOR, SAFETY GLAZING AND LOUVER INFORMATION**

**A3.31**

**ARCHITECT**

HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**

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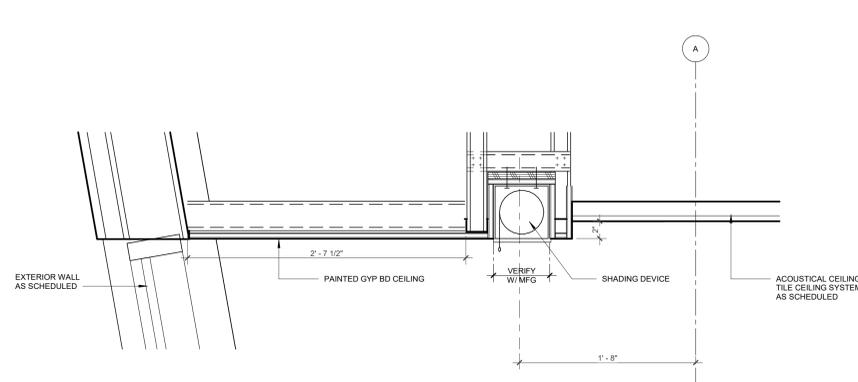
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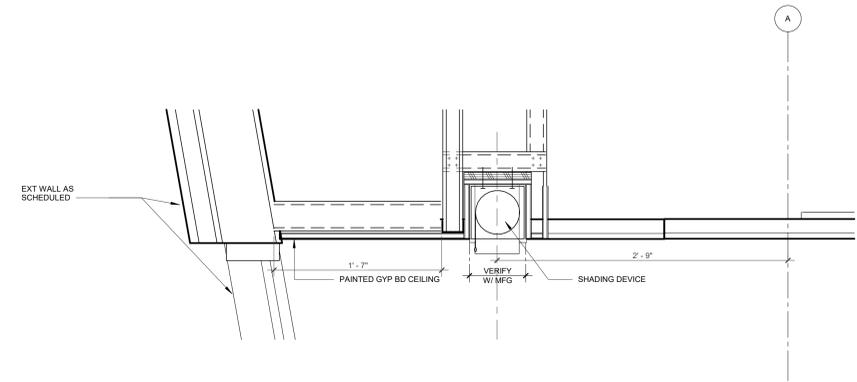
**OWNER**  
MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661



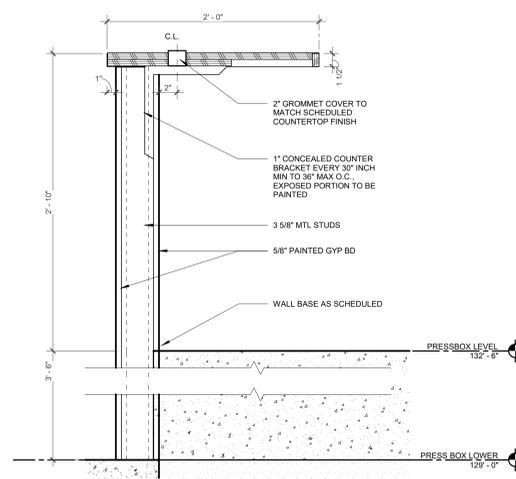
12/21/2023



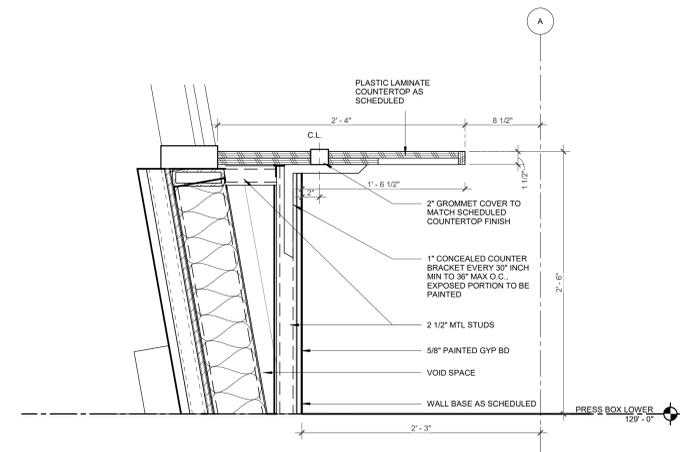
**08 CEILING DETAIL- MOTORIZED ROLLER SHADE AT EXT WINDOW IN VIP SUITE**  
1 1/2" = 1'-0"



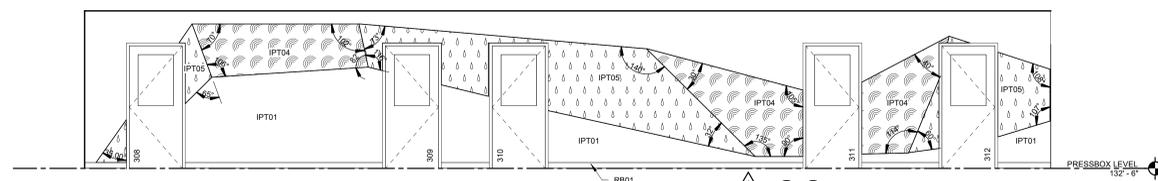
**07 CEILING DETAIL - MOTORIZED ROLLER SHADE AT EXT WINDOW**  
1 1/2" = 1'-0"



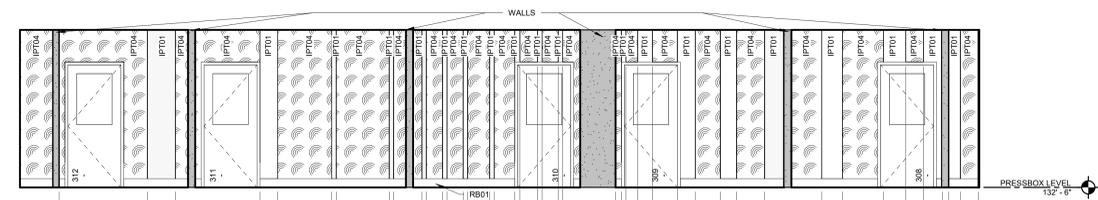
**06 SECTION DETAIL - COUNTER AT TIERED LEVEL**  
1 1/2" = 1'-0"



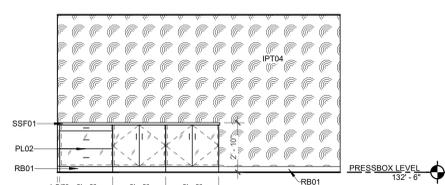
**05 SECTION DETAIL - COUNTER AT LOWER LEVEL**  
1 1/2" = 1'-0"



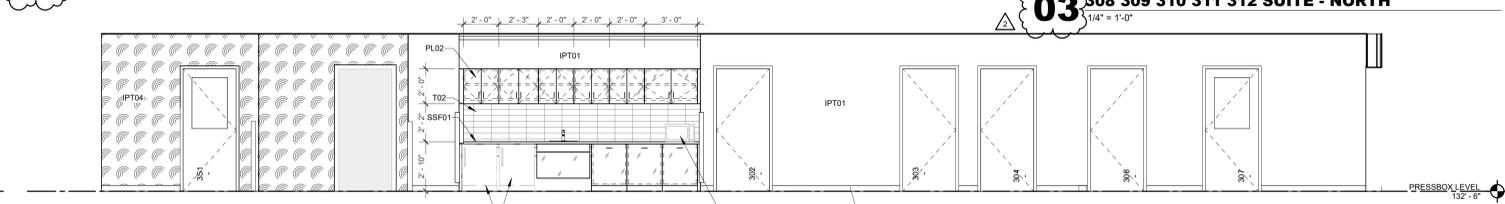
**04 CORRIDOR SOUTH**  
1/4" = 1'-0"



**03 308 309 310 311 312 SUITE - NORTH**  
1/4" = 1'-0"



**02 313 VIP SUITE - NORTH**  
1/4" = 1'-0"



**01 CORRIDOR - NORTH**  
1/4" = 1'-0"

REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
2	ADDENDUM #4	12/21/2023

HKS PROJECT NUMBER  
**26095.000**

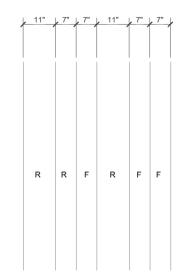
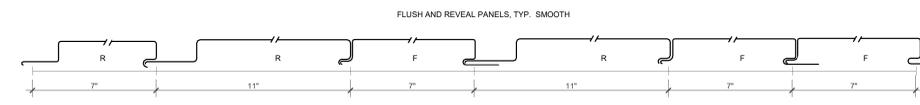
DATE  
**11/20/23**

ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**INTERIOR ELEVATIONS AND DETAILS**

SHEET NO.

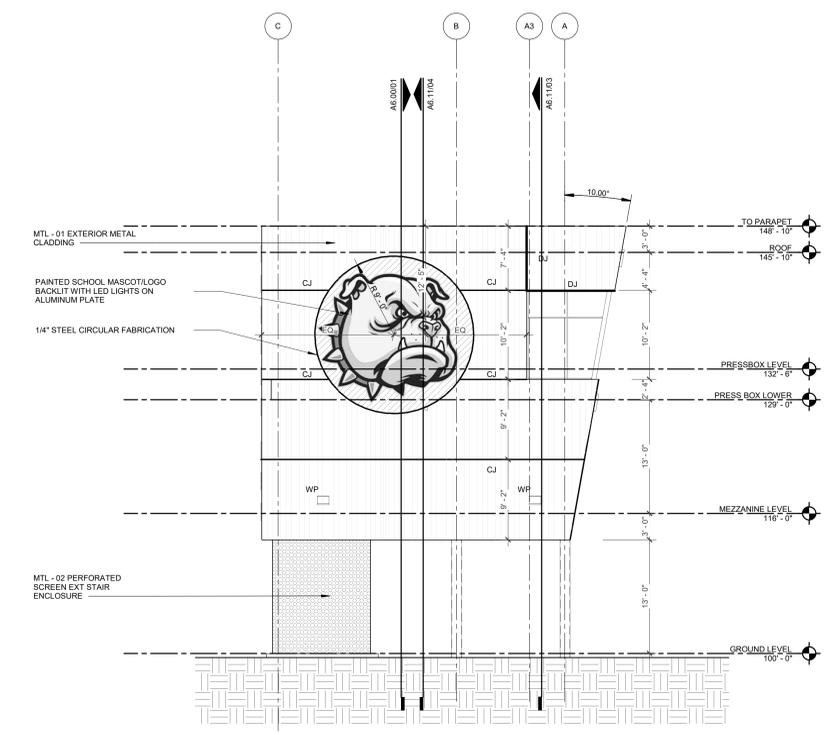
**A3.51**

EXTERIOR MATERIALS LEGEND	
FINISH INFORMATION	GRAPHIC SYMBOL
<b>EIFS-01</b>	
TYPE: EIFS	
MANUF: PAREX	
COLOR: SW-6831	
SIZE: REF. ELEVATION	
INSTALL: EXT WALL	
<b>MTL-01</b>	
TYPE: METAL WALL PANEL	
MANUF: PAC-CLAD	
COLOR: ZINC IN ALUM	
SIZE: 7" FLUSH, 7" & 11" REVEAL	
INSTALL: REF. ENLARGED PANEL DETAIL, EXT WALL	
<b>MTL-02</b>	
TYPE: PERFORATED WALL SCREEN	
MANUF: MCNICHOLES	
COLOR: ALUMINUM	
SIZE: 4"x8" PANELS, 0.050" THICKNESS	
INSTALL: EXT WALL SCREEN	
NOTATIONS LEGEND	
CJ	CONTROL JOINT
DJ	DEFLECTION JOINT
F	FLUSH PAC-CLAD WALL PANEL
R	REVEAL PAC-CLAD WALL PANEL

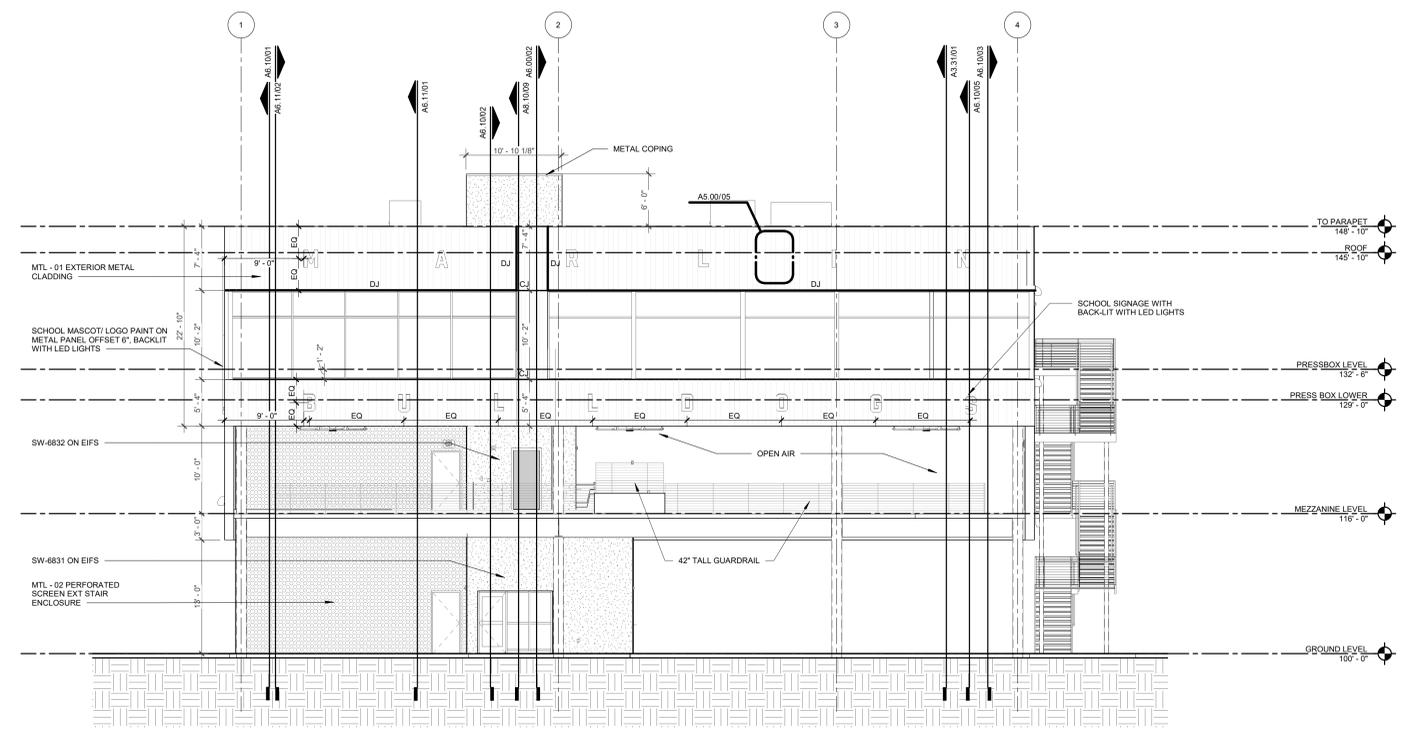


**06 FLUSH AND REVEAL PANEL DETAIL**  
3/8" = 1'-0"

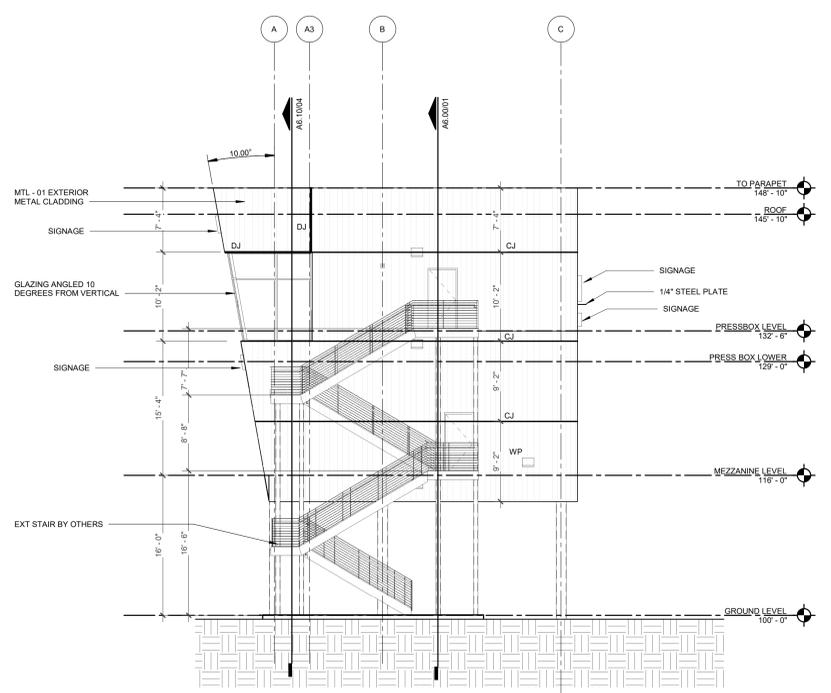
**05 FLUSH AND REVEAL METAL PANEL PATTERN**  
1/2" = 1'-0"



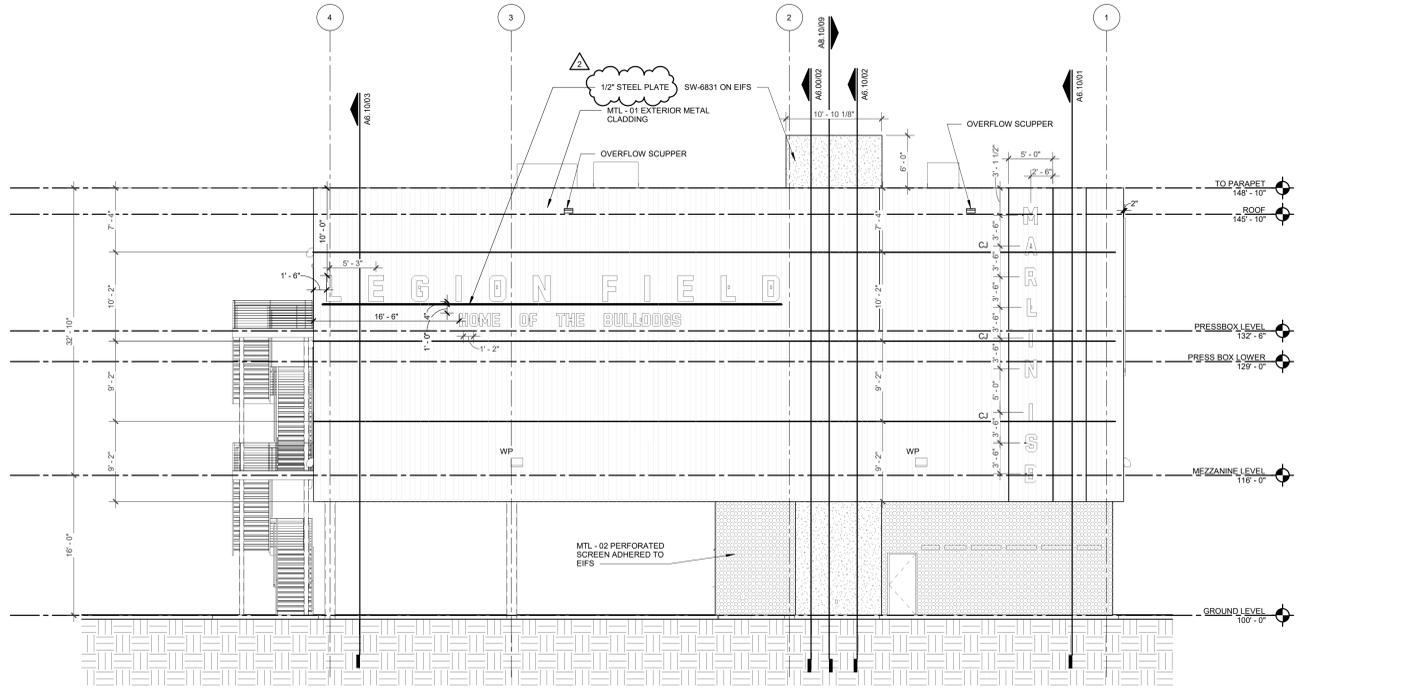
**04 WEST ELEVATION**  
1/8" = 1'-0"



**03 SOUTH ELEVATION**  
1/8" = 1'-0"



**02 EAST ELEVATION**  
1/8" = 1'-0"



**01 NORTH ELEVATION**  
1/8" = 1'-0"

REVISION NO.	DESCRIPTION	DATE
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HKS PROJECT NUMBER  
**26095.000**  
DATE  
**11/20/23**  
ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**EXTERIOR ELEVATIONS**

SHEET NO.  
**A5.00**





**ARCHITECT**

HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**

CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**LANDSCAPE**

CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**STRUCTURAL**

HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**MEP**

ROMINE, ROMINE & BURGESS, INC.  
300 GREENLEAF ST  
FORT WORTH, TX 76107



## MARLIN

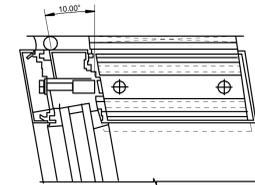
**MARLIN ISD PRESS BOX  
678 SUCCESS DR B  
MARLIN, TX 76661**

**OWNER**  
MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661



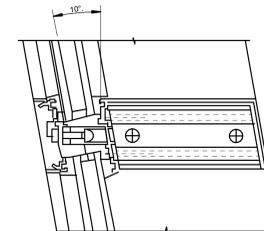
12/21/2023

NOTE: KAWNEER 1600 WALL SYSTEM 1, REF. SPECS FOR ADDITIONAL INFORMATION



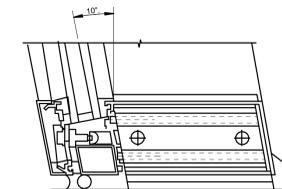
**05 SLOPED GLAZING DETAIL C**  
3/8" = 1'-0"

NOTE: KAWNEER 1600 WALL SYSTEM 1, REF. SPECS FOR ADDITIONAL INFORMATION



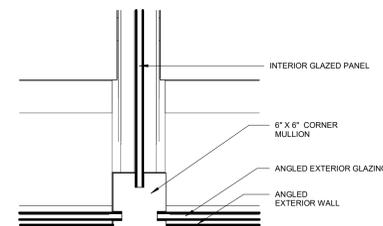
**04 SLOPED GLAZING DETAIL B**  
3/8" = 1'-0"

NOTE: KAWNEER 1600 WALL SYSTEM 1, REF. SPECS FOR ADDITIONAL INFORMATION

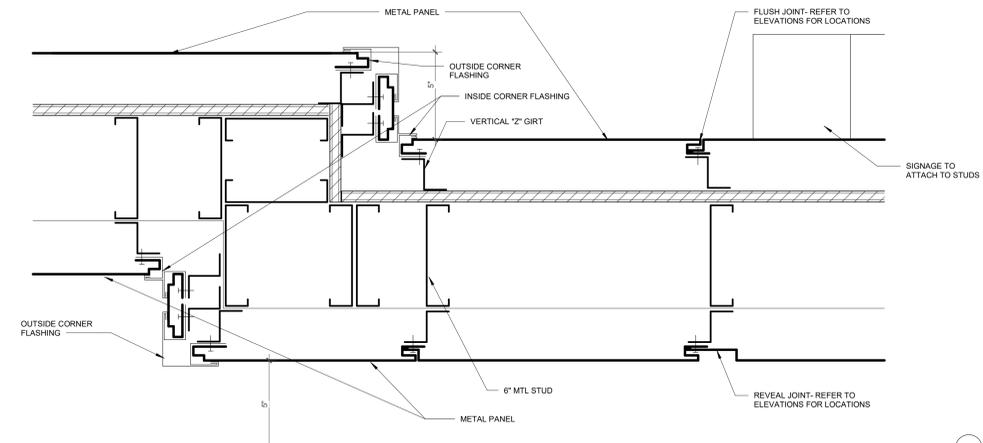


**03 SLOPED GLAZING DETAILS A**  
3/8" = 1'-0"

KAWNEER 1600 WALL SYSTEM 1



**02 WALL @ SLOPED GLASS**  
1 1/2" = 1'-0"



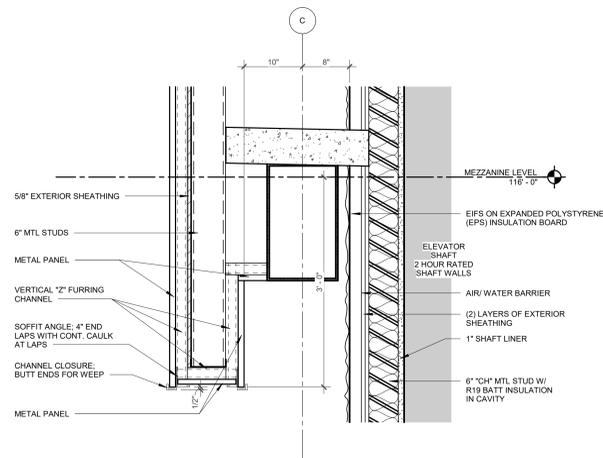
**01 MARLIN ISD SIGNAGE**  
3" = 1'-0"

REVISION NO.	DESCRIPTION	DATE
1	ADDENDUM #1	12/21/2023

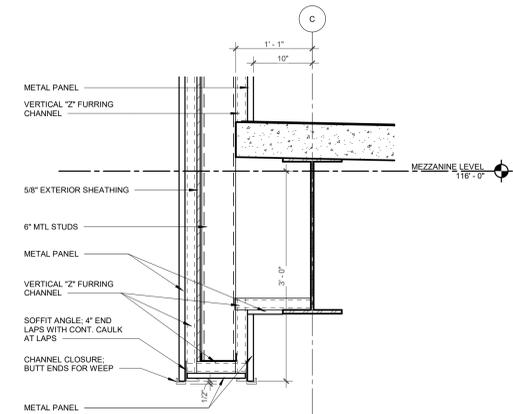
HKS PROJECT NUMBER  
**26095.000**  
DATE  
**11/20/23**  
ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**EXTERIOR DETAILS**

SHEET NO.

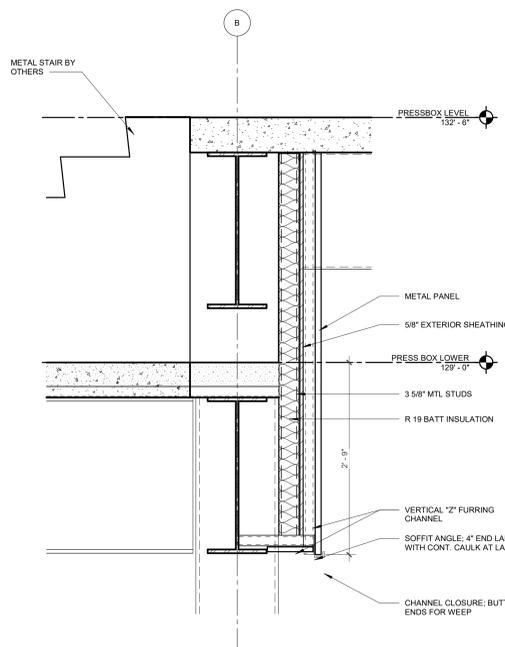
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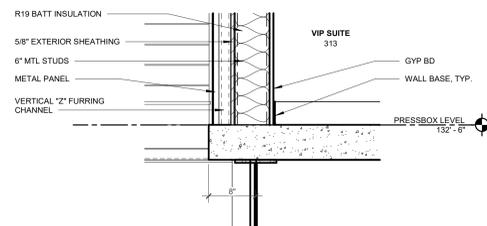
**10 EXT-EXT METAL PANEL @ ELEVATOR**  
1" = 1'-0"



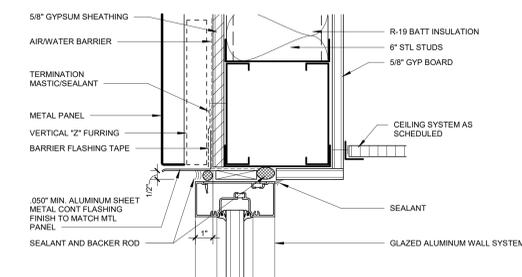
**03 EXT-EXT METAL PANEL @ MEZZANINE 2**  
1" = 1'-0"



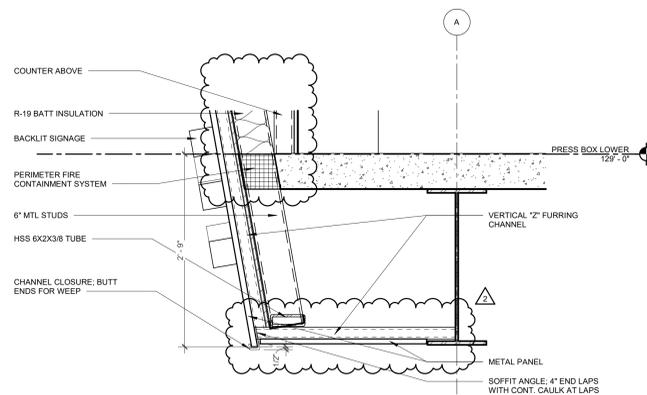
**12 EXT WALL @ TIERED LEVEL, TYP.**  
1" = 1'-0"



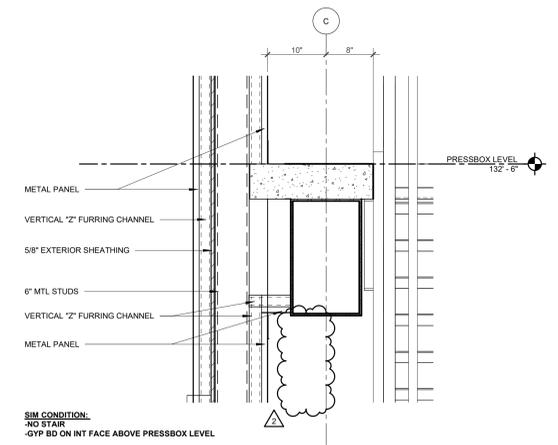
**09 INT METAL PANEL @ STAIR**  
1" = 1'-0"



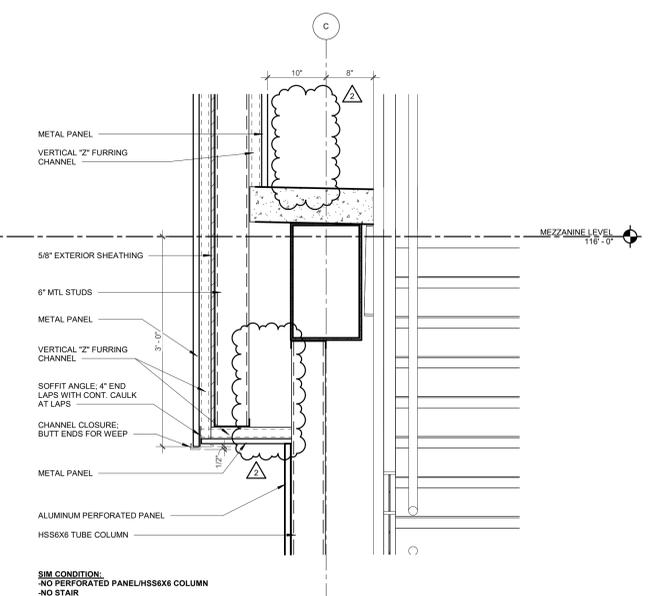
**08 WINDOW HEAD**  
3" = 1'-0"



**05 EXT-INT METAL PANEL ANGLED WALL @ SUITES**  
1" = 1'-0"



**02 EXT-EXT METAL PANEL @ PRESSBOX**  
1" = 1'-0"



**01 EXT-EXT METAL PANEL @ MEZZANINE**  
1" = 1'-0"

**GENERAL NOTES**  
BASIS OF DESIGN FOR GLAZED ALUMINUM FRAMING SYSTEM IS KAWNEER 2260IG WITH OPTIONAL PRESSURE PLATE. INTENT IS TO PROVIDE A WINDOW SYSTEM THAT CAN ACCOMMODATE A DOUBLE SEALANT APPROACH AS SHOWN IN THE DETAILS.

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**26095.000**  
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**11/20/23**  
ISSUE  
**ISSUE FOR BID AND PERMIT**  
SHEET TITLE  
**METAL PANEL DETAILS 01**

**ARCHITECT**  
HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**  
CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**LANDSCAPE**  
CEI ENGINEERING ASSOCIATES, INC.  
3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**STRUCTURAL**  
HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**MEP**  
ROMINE, ROMINE & BURGESS, INC.  
300 GREENEAF ST  
FORT WORTH, TX 76107



**MARLIN ISD PRESS BOX**  
678 SUCCESS DR B  
MARLIN, TX 76661

**OWNER**  
MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661



12/21/2023

NO.	DESCRIPTION	DATE
1	ADDENDUM #2	12/08/2023
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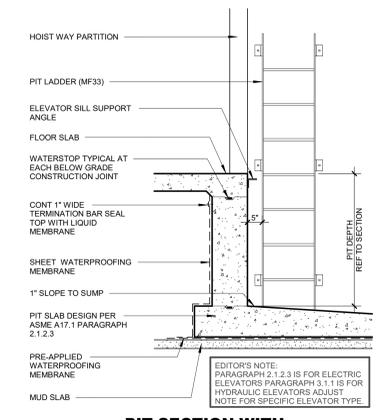
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**26095.000**

DATE  
**11/20/23**

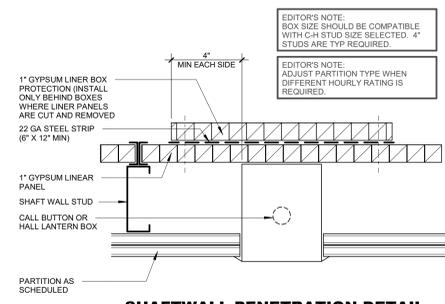
ISSUE  
**ISSUE FOR BID AND PERMIT**

SHEET TITLE  
**ELEVATOR PLAN AND DETAILS**

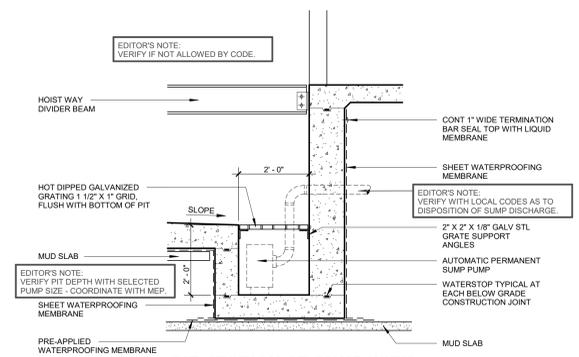
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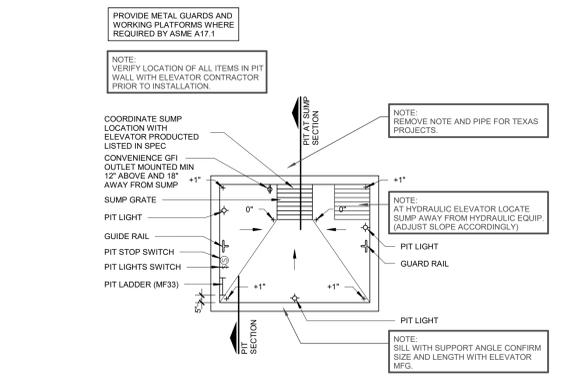
**10 PIT SECTION WITH POSITIVE SIDE WATERPROOFING**  
1/2" = 1'-0"



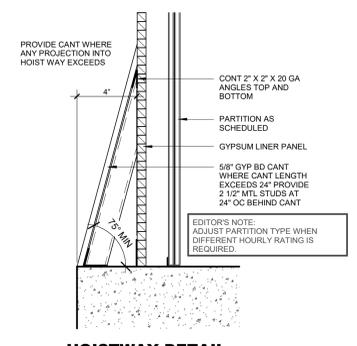
**06 SHAFTWALL PENETRATION DETAIL AT CALL BOX AND OR HALL LANTERN**  
3" = 1'-0"



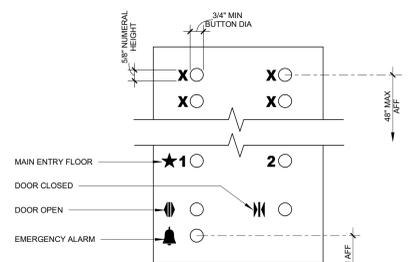
**04 PIT SECTION AT SUMP WITH POSITIVE SIDE WATERPROOFING**  
1/2" = 1'-0"



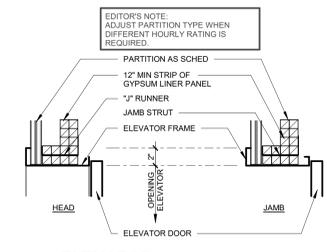
**01 ELEVATOR PIT PLAN (TYPICAL 1 CAB)**  
1/4" = 1'-0"



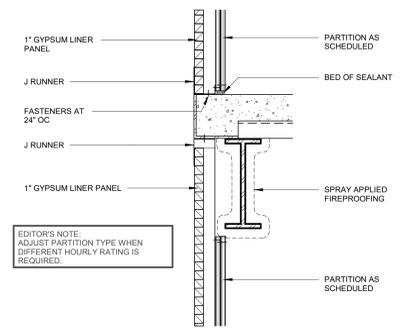
**11 HOISTWAY DETAIL PROJECTION CANT**  
NTS



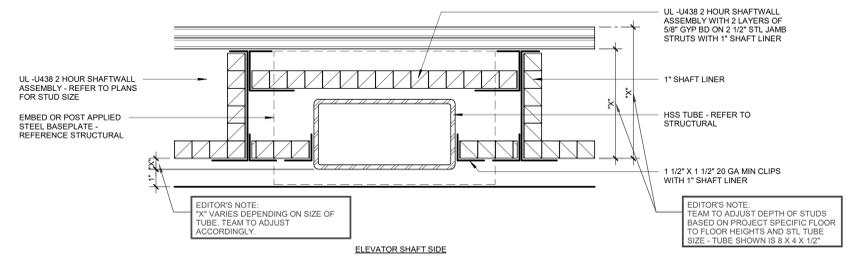
**07 ELEVATOR PANEL DETAIL**  
3" = 1'-0"



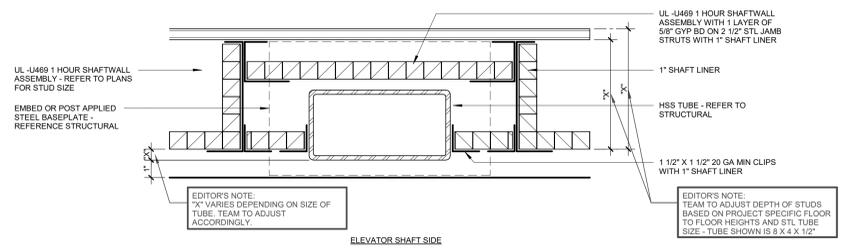
**05 ELEVATOR DOOR DETAIL DRYWALL**  
1 1/2" = 1'-0"



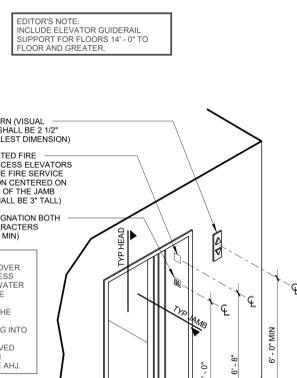
**02 SHAFTWALL AT ELEVATOR**  
1 1/2" = 1'-0"



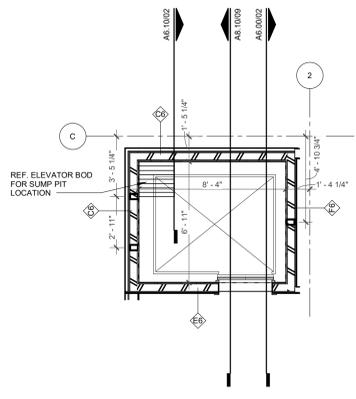
**12 FIRE PROTECTION DETAIL AT ELEVATOR GUIDERAIL SUPPORT - STEEL TUBE AT 2 HOUR WALL**  
3" = 1'-0"



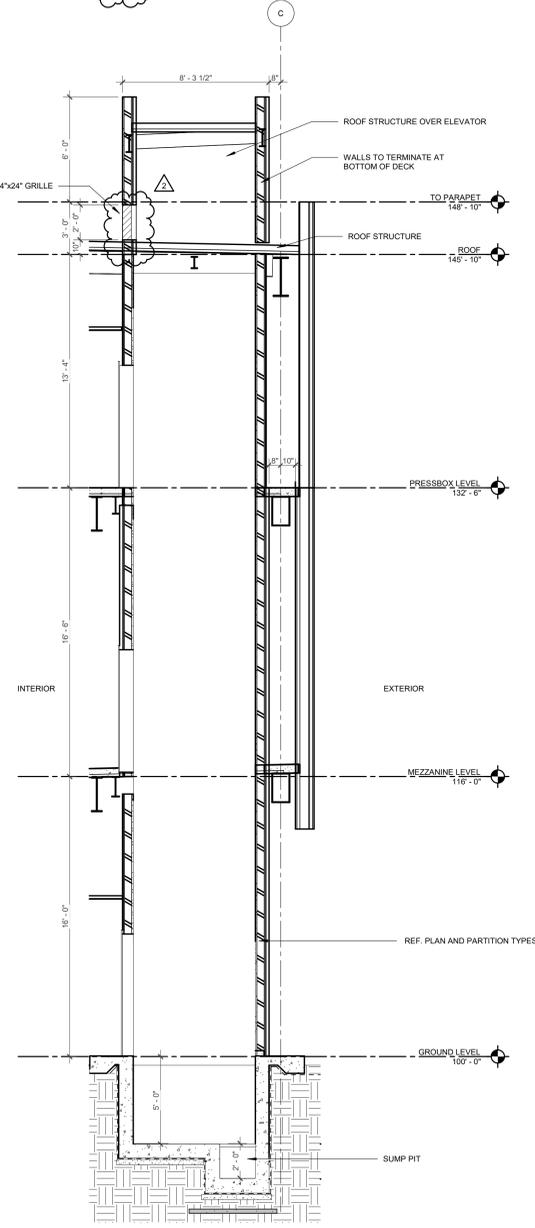
**08 FIRE PROTECTION DETAIL AT ELEVATOR GUIDERAIL SUPPORT - STEEL TUBE AT 1 HOUR WALL**  
3" = 1'-0"



**03 ELEVATOR ENTRY AND MOUNTING HEIGHTS**  
NTS



**13 ELEVATOR PLAN**  
1/4" = 1'-0"



**09 ELEVATOR SECTION**  
1/4" = 1'-0"

REVISION NO.	DESCRIPTION	DATE
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2	ADDENDUM # 4	12/21/2023

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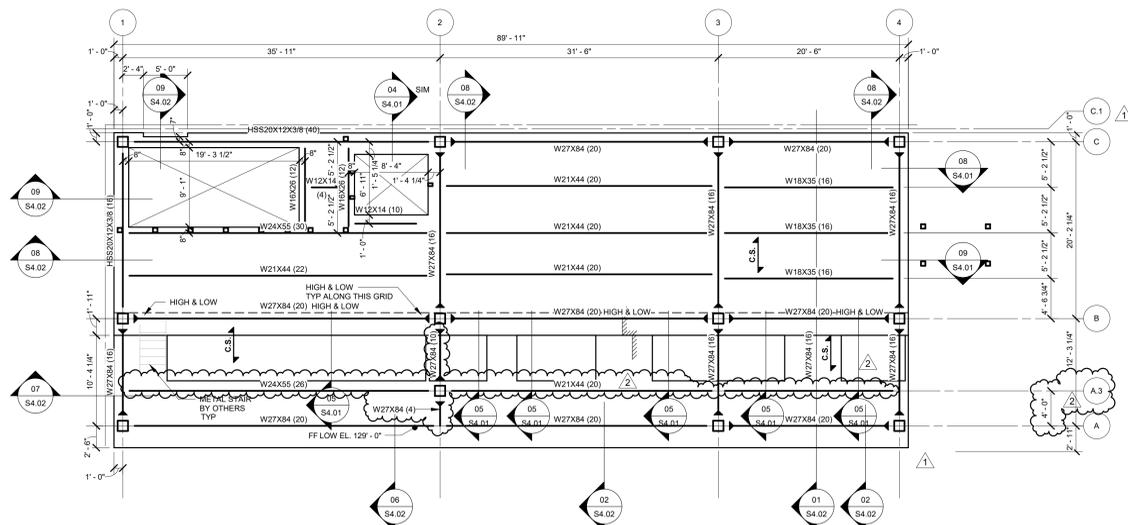
DATE  
**11/16/2023**

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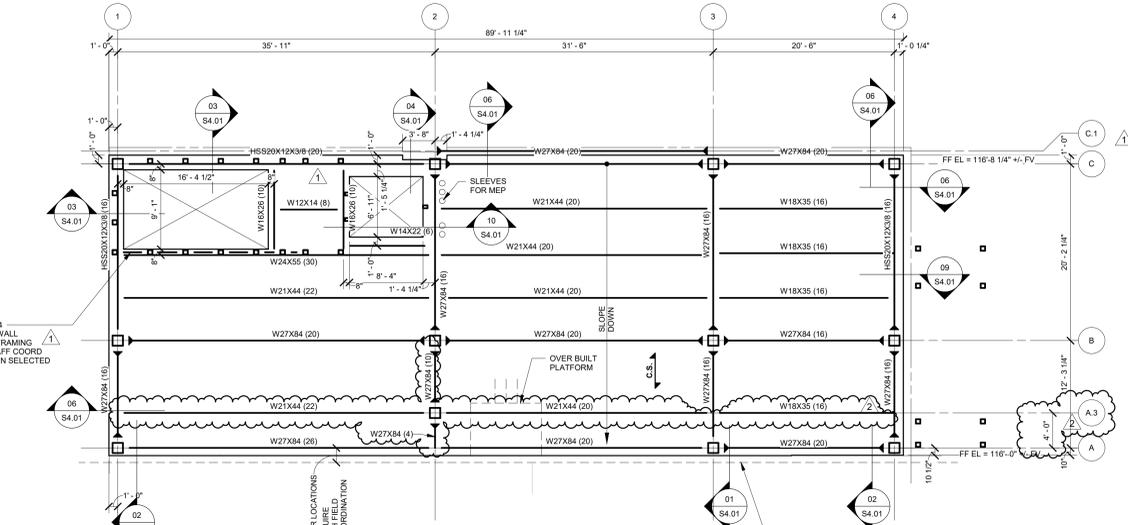
SHEET TITLE  
**FRAMING PLAN**

SHEET NO.  
**S2.01**

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**03 PRESS BOX LEVEL FRAMING PLAN**  
1/8" = 1'-0"

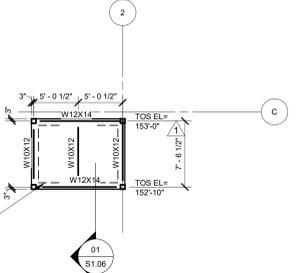


**02 MEZZANINE LEVEL FRAMING PLAN**  
1/8" = 1'-0"

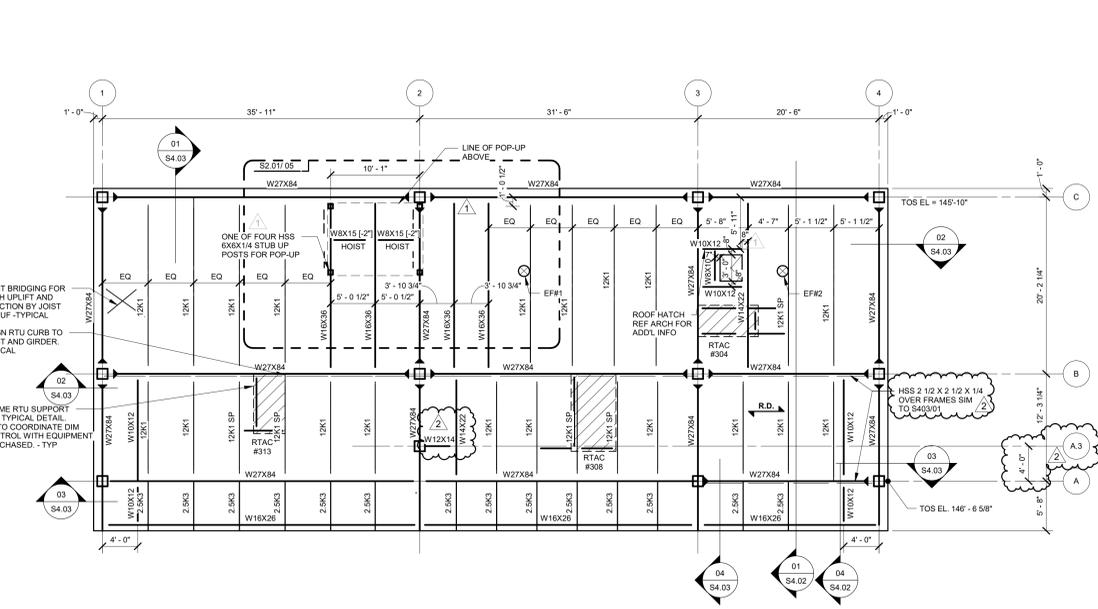
**MEZZANINE NOTES**

- MEZZ FINISHED FLOOR ELEVATION MUST BE VERIFIED/COORDINATED WITH EXISTING BLEACHER ELEVATIONS. GC/FABRICATOR TO VERIFY ELEVATION OF BLEACHERS PRIOR TO PRODUCTION OF SHOP DRAWINGS AND COORDINATE AS NEEDED.
- STEEL TO BE ERRECTED WITHOUT PAINT. AFTER STEEL IS ERRECTED (BEFORE WALLS AND FINISHES ARE INSTALLED) STEEL SHALL BE COATED IN CLEAR HIGH PERFORMANCE PROTECTIVE COATING. REFERENCE ARCHITECTURAL FINISHING REQUIREMENTS FOR ADDITIONAL INFORMATION. ARCH INTENT IS TO PROVIDE A LIGHT PATINA ON THE EXPOSED STEEL.

- PLAN NOTES:**
- C.S. INDICATES COMPOSITE SLAB SLAB SYSTEM = 3" COMP SLAB PLUS 3" W/C FOR A TOTAL THICKNESS OF 6". SEE GEN NOTES FOR ADDL INFO. REINFORCE W/ 6#8-W/14XW/14 WWF AND 4 POUNDS OF S/M FIBER MESH 600 PER CUBIC YARD. SEAL W/ TRAFFIC COATING PER ARCH.
  - R.D. INDICATES 1.5B ROOF DECK - SEE PLAN NOTES FOR ADDL INFO.
  - ELEVATOR BASIS OF DESIGN IS SCHINDLER 3100 MRL CONTACT EOR/ADR. IF SELECTED EQUIPMENT VARIES, CHANGES TO STRUCTURE MAY BE REQ'D.
  - RTU BASIS OF DESIGN IS A GENERIC 2,000 LB RTU. FINAL SELECTION AND FOOTPRINT WILL BE DETERMINED BASED ON EQUIPMENT ACTUALLY PURCHASED FOR THE PROJECT. GC/ERECTOR ARE TO COORDINATE CURB AND ROOF PENETRATIONS TO ALLOW FOR ACTUAL EQUIPMENT PURCHASED.



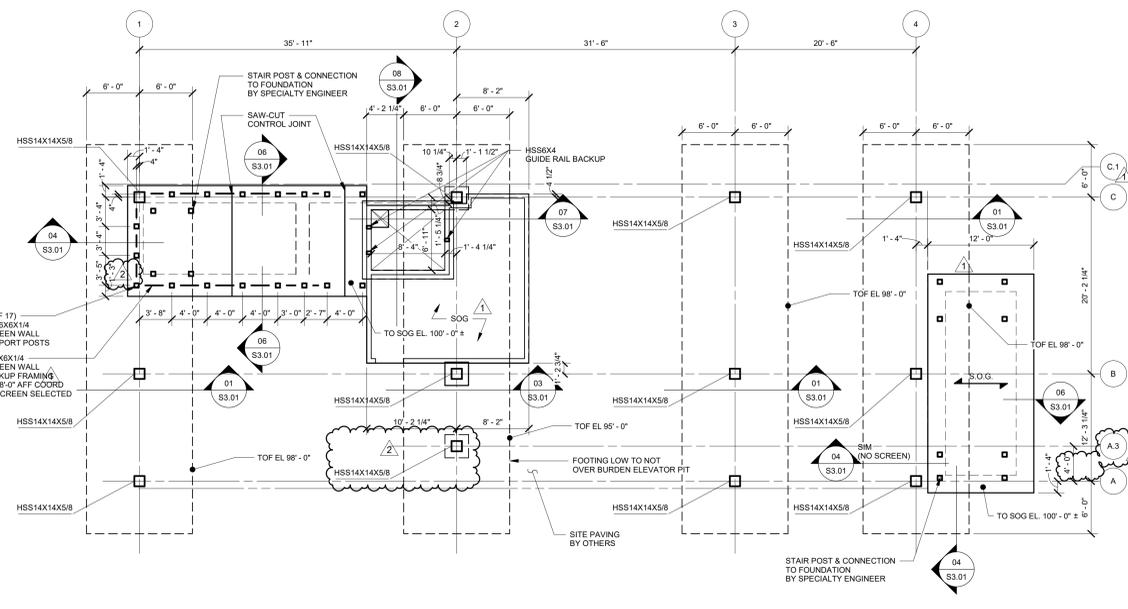
**05 ROOF POPUP FRAMING PLAN**  
1/8" = 1'-0"



**04 PRESS BOX ROOF FRAMING PLAN**  
1/8" = 1'-0"

**ROOF PLAN NOTES:**

- JOISTS MARKED SP ARE TO BE DESIGNED FOR ADDITIONAL BOULB POINT LOAD AT RTU CURB CORNERS. CONTRACTOR TO COORDINATE CURB LOCATIONS WITH JOIST ENGINEER.



**01 FOUNDATION PLAN**  
1/8" = 1'-0"

**NOTES**

- COLLUMN AND FOOTING LOCATIONS ARE TO BE COORDINATED WITH EXISTING BLEACHER LOCATIONS. DO NOT UNDERMINE EXISTING BLEACHER FOUNDATIONS TO INSTALL NEW FOOTINGS.
- EL 100'-0" TO BE COORDINATED W/ SITE GRADING.

**ARCHITECT**  
HKS, INC.  
350 N SAINT PAUL ST  
SUITE 100  
DALLAS, TX 75201

**CIVIL ENGINEER**  
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3030 LBJ FREEWAY  
SUITE 100  
DALLAS, TX 75234

**LANDSCAPE**  
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**STRUCTURAL**  
HKS, INC.  
350 N SAINT PAUL ST  
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**MEP**  
ROMINE, ROMINE & BURGESS, INC.  
300 GREENLEAF ST  
FORT WORTH, TX 76107



**MARLIN ISD PRESS BOX**  
**678 SUCCESS DR B**  
**MARLIN, TX 76661**

**OWNER**  
MARLIN ISD  
678 SUCCESS DR B  
MARLIN, TX 76661

**REGISTERED PROFESSIONAL ENGINEER**  
MARTIN S. DIERKSEN  
116848  
12/11/23  
Registered Engineering Firm HKS Inc.  
Firm Registration Number: F-2417

REVISION NO.	DESCRIPTION	DATE
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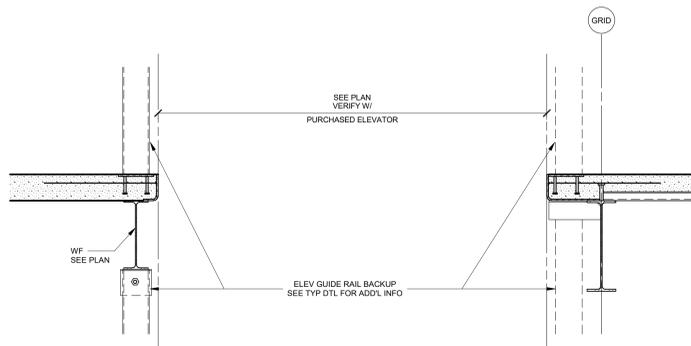
HKS PROJECT NUMBER  
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DATE  
**11/16/2023**

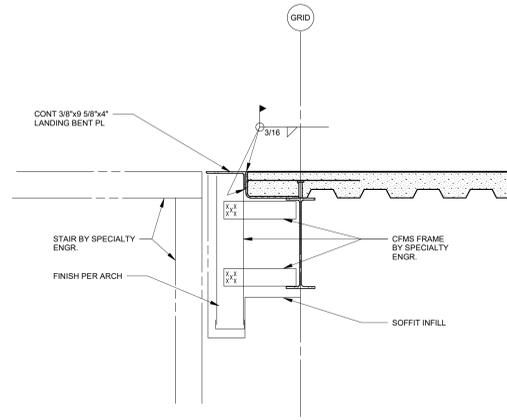
ISSUE  
**ISSUE FOR BID AND PERMIT**

SHEET TITLE  
**SECTIONS AND DETAILS**

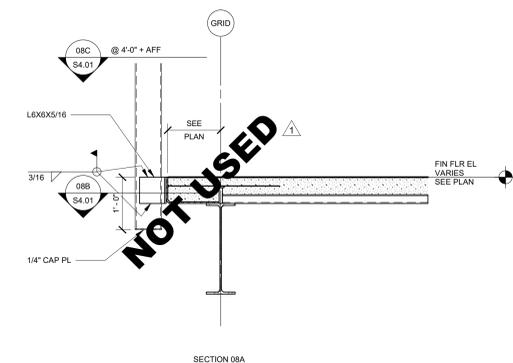
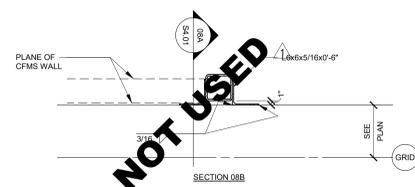
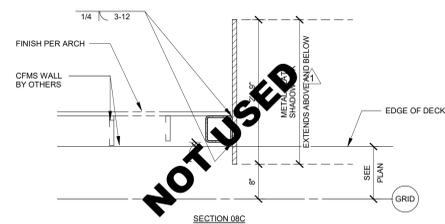
SHEET NO.  
**S4.01**



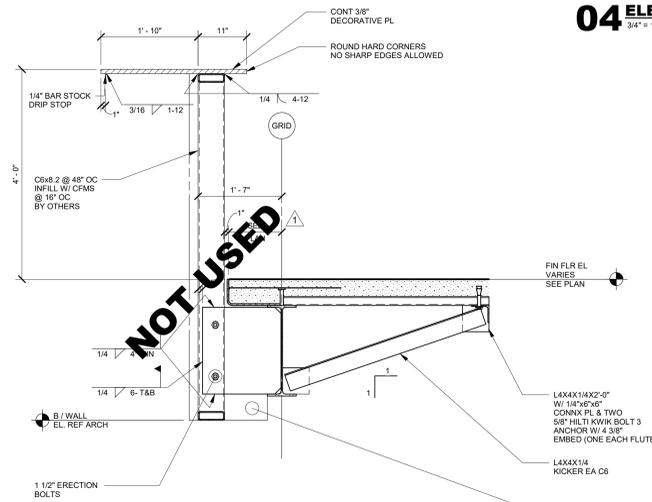
**10 EXT STAIR INTER FACE**  
3/4" = 1'-0"



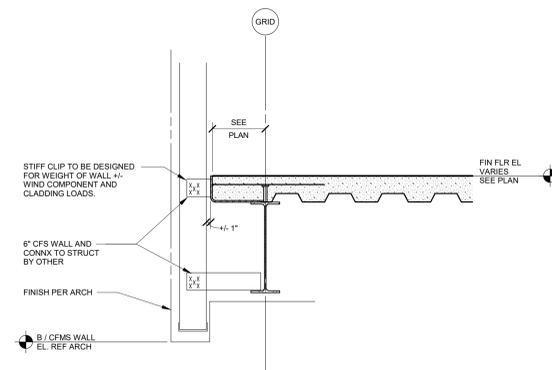
**09 MEZZ LEVEL W / EXT WALL**  
3/4" = 1'-0"



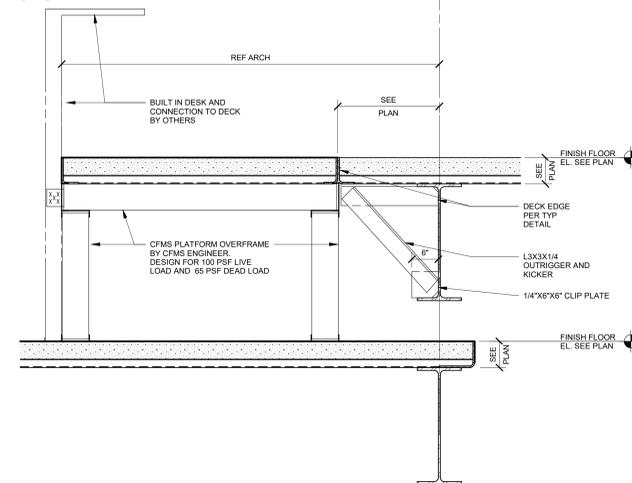
**08 MEZZ JAMB @ SHADOW BOX FRAME**  
3/4" = 1'-0"



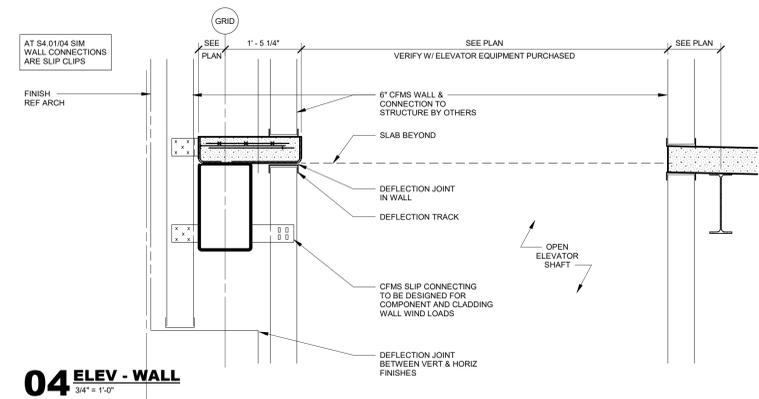
**07 MEZZ @ SHADOW BOX FRAME**  
3/4" = 1'-0"



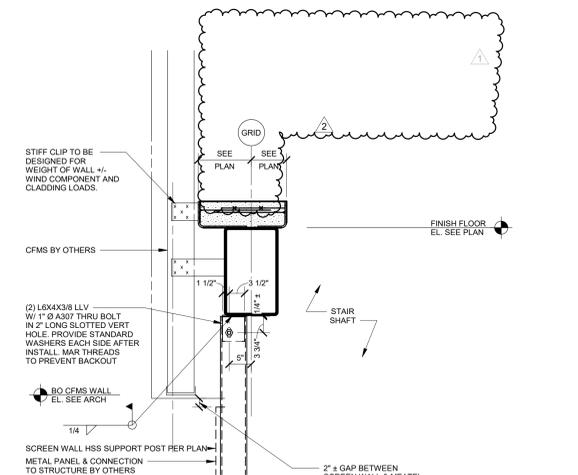
**06 MEZZ LEVEL W / EXT WALL**  
3/4" = 1'-0"



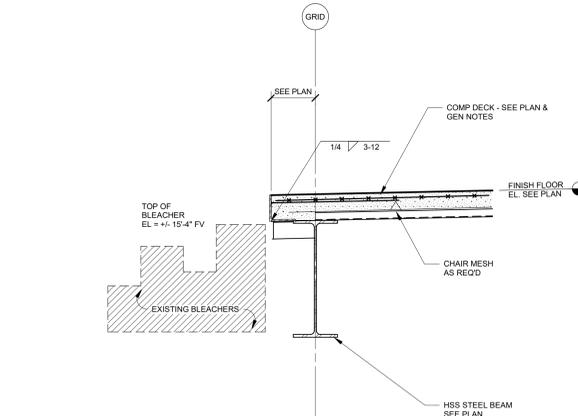
**05 PRESS BOX STEP**  
3/4" = 1'-0"



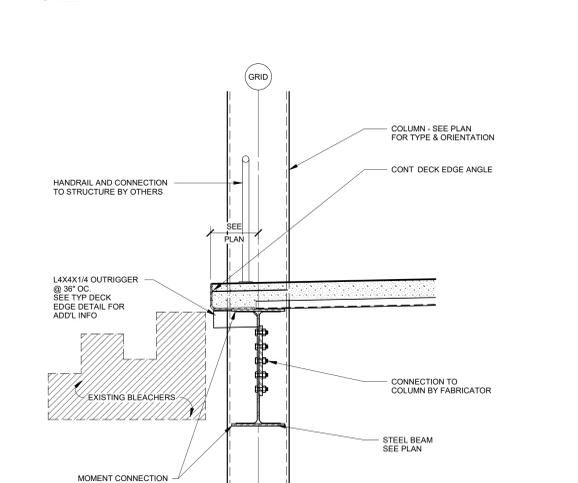
**04 ELEV - WALL**  
3/4" = 1'-0"



**03 STAIR - WALL**  
3/4" = 1'-0"



**02 BLEACHER - MEZ WALK ON**  
3/4" = 1'-0"



**01 TYPICAL BLEACHER-MEZZ DETAIL**  
3/4" = 1'-0"

Project Manual



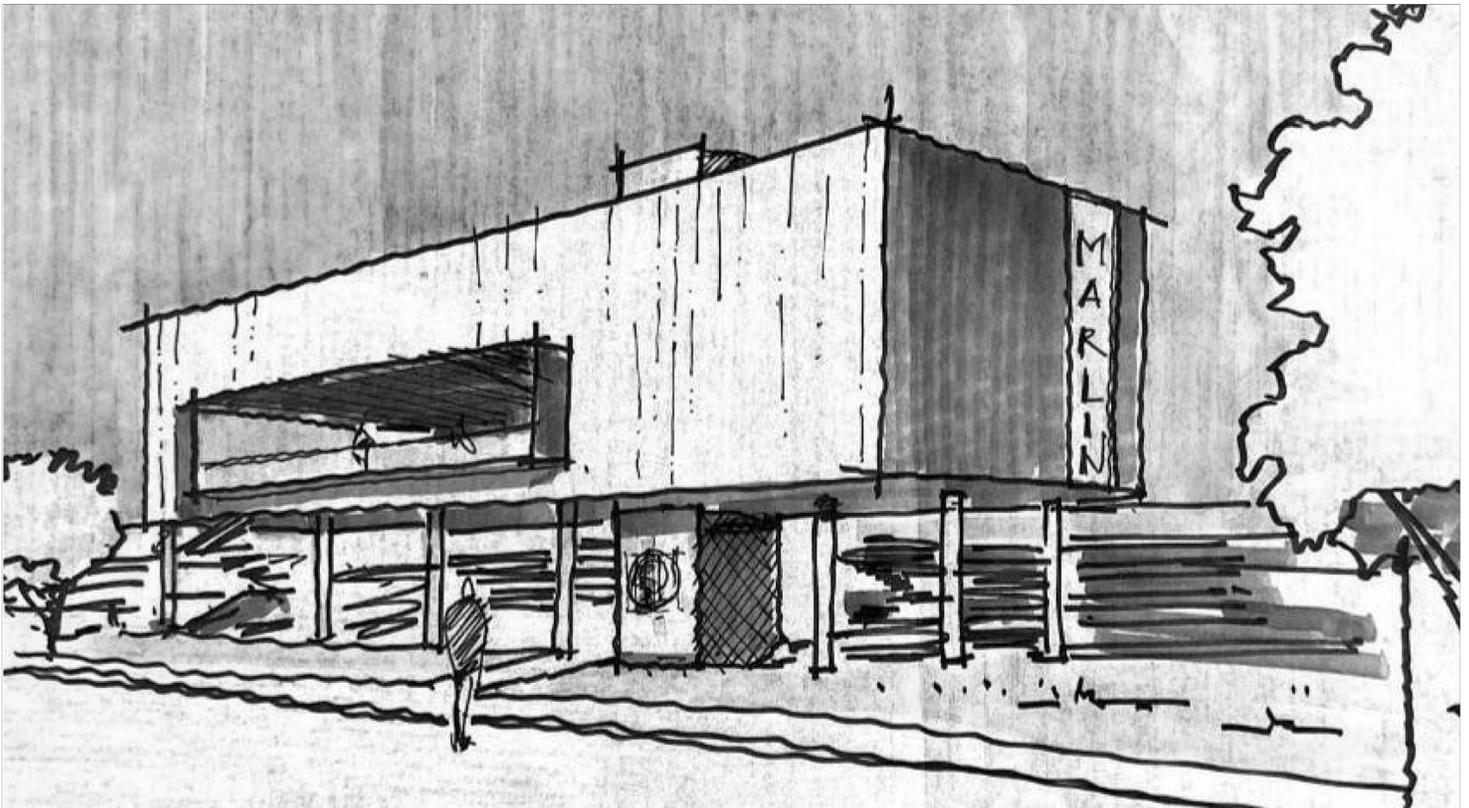
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Marlin Independent School District

Press Box

Marlin, Texas

Addendum 04  
December 21, 2023



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**PROJECT MANUAL**  
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**LEGEND**

First Column:	Current Date for Section
Second Column:	Checked Indicates Section is Included in Current Issue
Third Column:	Section Number
Fourth Column:	Section Title
Fifth Column:	Section Author

**NOTES FOR REVISED SPECIFICATIONS**

1. Deleted information is indicated by STRIKETHROUGH; for example, ~~THIS IS DELETED~~.
2. Added information is indicated by DOUBLE UNDERLINE; for example, THIS IS ADDED.

**ISSUES**

2023-11-16	Issue for Bid and Permit
2023-12-21	Addendum 04

**DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS**

2023-11-16	<input type="checkbox"/>	0	00100	Advertisement for Proposals
2023-11-16	<input type="checkbox"/>	0	00200	Instructions to Proposers
2023-11-16	<input type="checkbox"/>	0	00300	Proposal Form
2023-11-16	<input type="checkbox"/>	0	00400	Contractor's Qualifications Statement and Expense Record
2023-11-16	<input type="checkbox"/>	0		Felony Conviction Notice
2023-11-16	<input type="checkbox"/>	0		Conflict of Interest Questionnaire
2023-11-16	<input type="checkbox"/>	0		Affidavit of Non-Collusion
2023-11-16	<input type="checkbox"/>	0	00500	Standard Form of Agreement
2023-11-16	<input type="checkbox"/>	0	00610	Performance Bond
2023-11-16	<input type="checkbox"/>	0	00620	Payment Bond
2023-11-16	<input type="checkbox"/>	0		Notice of Award
2023-11-16	<input type="checkbox"/>	0		Notice to Proceed
2023-11-16	<input type="checkbox"/>	0	00700	General Conditions
2023-11-16	<input type="checkbox"/>	0	00800	Supplementary Conditions

**DIVISION 01 - GENERAL REQUIREMENTS**

2023-11-16	<input type="checkbox"/>	0	01 0100	Summary of Work
2023-11-16	<input type="checkbox"/>	0	01 0190	Contract Considerations
2023-11-16	<input type="checkbox"/>	0	01 0390	Coordination and Meetings
2023-11-16	<input type="checkbox"/>	0	01 2100	Allowances

<b><u>2023-12-21</u></b>	<input checked="" type="checkbox"/>	<b><u>0</u></b>	<b><u>01 2300</u></b>	<b><u>Alternates</u></b>
2023-11-16	<input type="checkbox"/>	0	01 3000	Submittals
2023-11-16	<input type="checkbox"/>	0	01 4000	Quality Control
2023-11-16	<input type="checkbox"/>	0	01 5000	Construction Facilities and Temporary Controls
2023-11-16	<input type="checkbox"/>	0	01 6000	Materials and Equipment
2023-11-16	<input type="checkbox"/>	0	01 7000	Contract Closeout
2023-11-16	<input type="checkbox"/>	0	01 8000	Field Test for Water Leakage

**DIVISION 02 - EXISTING CONDITIONS**

NO SECTIONS

**DIVISION 03 - CONCRETE**

2023-11-16	<input type="checkbox"/>	0	03 1100	Concrete Forming
2023-11-16	<input type="checkbox"/>	0	03 1500	Concrete Accessories
2023-11-16	<input type="checkbox"/>	0	03 2000	Concrete Reinforcing
2023-11-16	<input type="checkbox"/>	0	03 3000	Cast-In-Place Concrete
2023-11-16	<input type="checkbox"/>	0	03 3500	Concrete Finishing

**DIVISION 04 – MASONRY**

NO SECTIONS

**DIVISION 05 - METALS**

2023-11-16	<input type="checkbox"/>	0	05 1200	Structural Steel Framing
2023-11-16	<input type="checkbox"/>	0	05 2100	Steel Joist Framing
2023-11-16	<input type="checkbox"/>	0	05 3100	Steel Decking
2023-11-16	<input type="checkbox"/>	0	05 4000	Cold-Formed Steel Framing
2023-11-16	<input type="checkbox"/>	0	05 5000	Metal Fabrications
2023-11-16	<input type="checkbox"/>	0	05 5113	Metal Stairs
<b><i>2023-12-21</i></b>	<input checked="" type="checkbox"/>	<b><i>1</i></b>	<b><i>05 5213</i></b>	<b><i>Pipe and Tube Railings</i></b>
<del>2023-11-16</del>	<input type="checkbox"/>	0	05 5250	Prefabricated Modular Aluminum Stair System
<b><i>2023-12-21</i></b>	<input checked="" type="checkbox"/>	<b><i>1</i></b>	<b><i>05 7000</i></b>	<b><i>Ornamental Metal</i></b>

**DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES**

2023-11-16	<input type="checkbox"/>	0	06 1053	Miscellaneous Rough Carpentry
2023-11-16	<input type="checkbox"/>	0	06 1643	Exterior Gypsum Sheathing
<b><i>2023-12-21</i></b>	<input checked="" type="checkbox"/>	<b><i>1</i></b>	<b><i>06 4023</i></b>	<b><i>Interior Architectural Woodwork</i></b>

**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

2023-11-16	<input type="checkbox"/>	0	07 1326	Sheet Waterproofing
2023-11-16	<input type="checkbox"/>	0	07 2100	Thermal Insulation
2023-11-16	<input type="checkbox"/>	0	07 2413	Exterior Insulation and Finish System (EIFS)
2023-11-16	<input type="checkbox"/>	0	07 2500	Mechanically Fastened Air and Water Barriers
2023-11-16	<input type="checkbox"/>	0	07 2617	Below Slab Vapor Retarders
<b><i>2023-12-21</i></b>	<input checked="" type="checkbox"/>	<b><i>1</i></b>	<b><i>07 4213</i></b>	<b><i>Formed Metal Wall Panels</i></b>

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2023-11-16	<input type="checkbox"/>	0	07 5013	Single-Ply Membrane Roofing
2023-11-16	<input type="checkbox"/>	0	07 6200	Sheet Metal Flashing and Trim
2023-11-16	<input type="checkbox"/>	0	07 7200	Roof Accessories
2023-11-16	<input type="checkbox"/>	0	07 8413	Penetration Firestopping
2023-11-16	<input type="checkbox"/>	0	07 8446	Fire-Resistive Joint Firestopping
2023-11-16	<input type="checkbox"/>	0	07 9200	Joint Sealants

## DIVISION 08 - OPENINGS

2023-11-16	<input type="checkbox"/>	0	08 1113	Hollow Metal Doors and Frames
2023-11-16	<input type="checkbox"/>	0	08 1416	Prefinished Flush Wood Doors
2023-11-16	<input type="checkbox"/>	0	08 3113	Access Doors and Frames
2023-11-16	<input type="checkbox"/>	0	08 4110	Interior Storefront
2023-11-16	<input type="checkbox"/>	0	08 4213	Aluminum Entrance Doors
2023-11-16	<input type="checkbox"/>	0	08 4400	Glazed Aluminum Framing Systems
2023-11-16	<input type="checkbox"/>	0	08 8000	Glazing

## DIVISION 09 – FINISHES

2023-11-16	<input type="checkbox"/>	0	09 2900	Gypsum Board Assemblies
2023-11-16	<input type="checkbox"/>	0	09 3000	Tiling
2023-11-16	<input type="checkbox"/>	0	09 5113	Acoustical Panel Ceilings
<b><u>2023-12-21</u></b>	<input checked="" type="checkbox"/>	<b><u>0</u></b>	<b><u>09 6500</u></b>	<b><u>Resilient Flooring (Alternate)</u></b>
2023-11-16	<input type="checkbox"/>	0	09 6513	Resilient Base and Accessories
2023-11-16	<input type="checkbox"/>	0	09 9100	Painting

## DIVISION 10 - SPECIALTIES

2023-11-16	<input type="checkbox"/>	0	10 2613	Wall and Corner Guards
2023-11-16	<input type="checkbox"/>	0	10 2813	Toilet Accessories
2023-11-16	<input type="checkbox"/>	0	10 4116	Emergency Key Cabinets
2023-11-16	<input type="checkbox"/>	0	10 4400	Fire Protection Specialties

## DIVISION 11 - EQUIPMENT

NO SECTIONS

## DIVISION 12 - FURNISHINGS

2023-11-16	<input type="checkbox"/>	0	12 2413	Roller Window Shades
2023-11-16	<input type="checkbox"/>	0	12 3661	Simulated Stone Countertops
2023-11-16	<input type="checkbox"/>	0	12 4910	Horizontal Louver Blinds

## DIVISION 13 - SPECIAL CONSTRUCTION

NO SECTIONS

## DIVISION 14 - CONVEYING EQUIPMENT

<input type="checkbox"/>	0	44 2100	Electric Traction Elevators
--------------------------	---	---------	-----------------------------

2023-12-21        0    14 2400    Hydraulic Elevators

## DIVISIONS 15 - 20

NO SECTIONS

### DIVISION 21 – GENERAL

2023-11-16        0    21 0000    Mechanical Special Provisions

### DIVISION 22 – PLUMBING

2023-11-16        0    22 0700    Plumbing Insulation  
2023-11-16        0    22 1000    Plumbing Piping  
2023-11-16        0    22 2000    Plumbing Valves, Strainers & Unions  
2023-11-16        0    22 3000    Plumbing  
2023-11-16        0    22 4000    Plumbing Fixtures

### DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

2023-11-16        0    23 0700    HVAC Insulations  
**2023-12-21**        **1**    **23 3000**    ***HVAC Air Distribution***  
**2023-12-21**        **1**    **23 8000**    ***Unitary Heating, Ventilating and Air Conditioning Equipment***  
2023-11-16        0    23 9900    Testing, Balancing and Commissioning

## DIVISIONS 24 - 25

NO SECTIONS

### DIVISION 26 – ELECTRICAL

2023-11-16        0    26 0100    Electrical Special Provisions  
2023-11-16        0    26 0519    Low Voltage Electrical Power Conductors and Cables  
2023-11-16        0    26 0526    Grounding and Bonding of Electrical Systems  
2023-11-16        0    26 0529    Hangers and Supports for Electrical Systems  
2023-11-16        0    26 0533    Raceways and Boxes for Electrical Systems  
2023-11-16        0    26 0800    Commissioning of Electrical Systems  
2023-11-16        0    26 0900    Instrumentation and Control for Electrical Systems  
2023-11-16        0    26 2000    Low Voltage Transformers  
2023-11-16        0    26 2416    Panelboards  
2023-11-16        0    26 2726    Wiring Devices  
2023-11-16        0    26 2813    Fuses  
2023-11-16        0    26 2816    Enclosed Switches  
2023-11-16        0    26 5113    Lighting Fixtures  
2023-11-16        0    26 6620    Elevator Electrical Support

### DIVISION 27 – COMMUNICATIONS

NO SECTIONS

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

2023-11-16        0    28 3000    Fire Detection and Alarm

**DIVISIONS 29 - 30**

NO SECTIONS

**DIVISION 31 - EARTHWORK**

2023-11-16        0    31 2400    Earthwork for Structures

**DIVISION 32 - EXTERIOR IMPROVEMENTS**

2023-12-21        0    32 3113    Chain Link Fencing (Alternate)    ■

**DIVISION 33 – UTILITIES**

NO SECTIONS

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SECTION 01 2300

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 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 Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. 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 Sum.

1.3 PROCEDURES

- A. Documentation: Show compliance with requirements for accepted alternates and the following, as applicable:
1. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate accepted alternates.
  2. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  3. Samples, where applicable or requested.
  4. Certificates and qualification data, where applicable or requested.
  5. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  6. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  7. Detailed comparison of Contractor's construction schedule using accepted alternates with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  8. Cost information, including change in the Contract Sum.
- B. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

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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.
- C. 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 revisions to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.
- E. 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.
- F. Acceptance of Alternates will be exercised at option of Owner in any order or combination.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

## **Deduct Alternates**

**Exterior Materials:**

- MTL-01 Exterior Metal Wall Panel: 7/8" Corrugated Aluminum Metal Wall Panel MBCI
- MTL-02 Chain Link Fence

**Interior Materials:**

- PL01 Formica Mouse Matte Finish (deduct alternate FOR SSF01)
- VCT Johnsonite, 572 cloudy (deduct alternate FOR CPT01)

## **Add Alternates**

**Exterior Materials:**

- MTL-01 Exterior Metal Wall Panel: VMZINC, weathered zinc
- MTL-02 Exterior Perforated Wall Screen: BOK Modern, Cor-ten material

END OF SECTION

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SECTION 05 5213

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Metal railings and supplementary items necessary for installation.

1. Steel railings.

B. Related Requirements:

1. Refer to Division 05 Section Metal Pan Stairs for steel tube railings associated with metal pan stairs.

1.2 DEFINITIONS

A. Unprotected Areas, Exterior Locations: Exterior areas exposed to the elements including but not limited to rain, snow, or ice.

B. Protected Areas, Interior and Exterior Protected Locations: Interior and protected exterior areas not exposed to the elements including but not limited to rain, snow, or ice.

1.3 DELEGATED ENGINEERING REQUIREMENTS

A. Contract Documents Design Intent: Drawings and Specifications indicate design intent for products and systems and do not necessarily indicate or specify total Work required. Contract Documents shall not be construed as an engineered design; furnish and install all Work required for a complete installation.

B. Delegated Engineering Responsibility: Contractor shall employ a qualified professional engineer to provide engineering for products and systems including attachment to building structure required to meet design intent of Contract Documents.

1. Preparation of structural analysis data including engineering calculations, shop drawings and other submittals signed and sealed by the qualified professional engineer.

C. Delegated Engineering Professional Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated for products and systems similar to this Project and has a record of successful in-service performance.

D. Coordination of Work:

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1. Product Variations: In the event of minor differences between products and systems of acceptable or available manufacturers, Contractor shall notify Architect of such differences and resolve conflicts in a timely manner. Failure of Contractor to provide notification shall be construed as acceptance of conditions indicated, and changes caused by minor differences between products and Contract Documents shall be included in the Work at no additional cost to Owner.

E. Allowable Adjustments: Minor dimension and profile adjustments may be made in interest of fabrication or erection methods or techniques or ability to satisfy design intent, provided design intent is maintained as determined by Architect. Proposed deviations shall include a detailed analysis of impact to adjacent substrates or other building systems, including related design or construction cost impacts. If accepted by Architect, deviations causing changes in materials, constructability, substrates, or conditions shall be included in the Work at no additional cost to Owner.

#### 1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer/fabricator's technical literature for each product and system indicated.

1. Include manufacturer/fabricator's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance. Including but not limited to the following:

- a. Fasteners.
- b. Post-installed anchors.
- c. Handrail brackets.
- d. Shop primer.
- e. Nonshrink, nonmetallic grout.

B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.

1. Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Delegated Engineering Calculations: Informational submittal for products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation; test reports are not acceptable substitute for calculations.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Research Reports: For post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

D. Field Quality Control Reports: Written report of testing and inspection required by "Field Quality Control".

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1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar in scope of this Project.
2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar in scope of this Project.

B. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

C. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1., the Building Code and Authorities Having Jurisdiction.

1.7 PRE-INSTALLATION CONFERENCE

A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

B. Coordinate installation of anchorages for railings.

1. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.
2. Deliver such items to Project site in time for installation.

C. Schedule installation of railings and guards so wall attachments are made only to completed walls.

1. Do not support railings and guards temporarily by any means that do not satisfy structural performance requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification.

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1. Keep railing members off ground and spaced by using pallets, dunnage, or other supports and spacers.
  2. Protect railing members and packaged materials from corrosion and deterioration.
- B. Repair or replace damaged materials or structures as directed.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
- B. Available Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, manufacturers/fabricators offering products that may be incorporated into the Work include, but are not limited to, those listed.
1. Alfab, Inc. (STAIRCO).
  2. American Stair, Inc.
  3. Pacific Stair Corporation.
  4. Sharon Companies Ltd. (Duvinage LLC).

### 2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

### 2.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of products and systems representing those indicated for this Project, without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance of Railings and Guards: Railings, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
    - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  2. Infill of Guards:
    - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
    - b. Infill load and other loads need not be assumed to act concurrently.

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- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change (Range): 120 deg F (49 deg C), ambient; 180 deg F (82 deg C), material surfaces.
  2. Thermal Cycling: No buckling, damaging stresses, damaging loads on fasteners, failure of operating units to function properly, and other detrimental effects.

## 2.4 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
1. Protected Areas, Interior and Exterior Protected Locations: Provide uncoated, non-galvanized steel including but not limited to pipe, tubes, plates, shapes, bars, sheets, rods and wire.
  2. Unprotected Areas, Exterior Locations and where Indicated: Provide galvanized, steel including but not limited to pipe, tubes, plates, shapes, bars, sheets, rods and wire.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

## 2.5 STEEL RAILINGS

- A. Tubing: ASTM A500/A500M (cold formed) or ASTM A513/A513M, Type 5.
- B. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C. Plates, Shapes, and Bars: ASTM A36/A36M.
- D. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

## 2.6 STAINLESS STEEL

### A. Wire Rope and Fittings:

#### 1. Manufacturers:

- a. Cable Connection (The).
- b. Carl Stahl DecorCable, Inc.
- c. Esmet, Inc.
- d. Feeney, Inc.
- e. Hayn Enterprises, LLC.
- f. Johnson, C. Sherman, Co., Inc.
- g. Loos & Co., Inc.; Cableware Division.
- h. Ronstan International Inc.
- i. Secosouth, Inc.

#### 2. Wire Rope: 1-by-19 wire rope made from wire complying with ASTM A 492, Type 316.

**3. Wire-Rope Fittings: Connectors of types indicated, fabricated from stainless steel, and with capability to sustain without failure a load equal to minimum breaking strength of wire rope with which they are used.**

2.7 FASTENERS

- A. General: Select fasteners for type, grade, and class required to comply with performance requirements and produce connections suitable for environmental exposure and anchoring railings to other construction indicated.
  - 1. Non-Galvanized Steel Components: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5 for zinc coating.
  - 2. Hot-Dip Galvanized Steel Components: Hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
  - 1. Protected Areas, Interior and Exterior Protected Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Unprotected Areas, Exterior Locations: Hot-dip zinc-coated steel bolts, ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
  - 3. Post-Tensioned Concrete Locations: Anchors shall not exceed 1 in (25 mm) embedment. Obtain Structural Engineer's written approval for all proposed anchors in post-tensioned concrete prior to installation.

2.8 PAINT MATERIALS

- A. Coordination: Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Shop Primers for Paint: Provide primers that comply with Division 09 Section Painting.
  - 1. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish system indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion, complying with ASTM D1187/D1187M.

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2.9 MISCELLANEOUS MATERIALS

- A. Welding Electrodes: Comply with AWS requirements.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for exterior use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.
  - 1. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.10 FABRICATION OF RAILINGS

- A. NAAMM Railing Standard: Comply with NAAMM AMP 521, "Pipe Railing Systems Manual."
  - 1. Metal Railings.
    - a. Locations, Typical:
      - 1) At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 - Completely sanded joint with some undercutting and pinholes okay.
- B. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
  - 1. Join components by welding unless otherwise indicated.
- C. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
  - 1. Clearly mark units for reassembly and coordinated installation.
  - 2. Use connections that maintain structural value of joined pieces.
- D. Cut, drill, and punch metals cleanly and accurately.
  - 1. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated.
  - 2. Remove sharp or rough areas on exposed surfaces.
- E. Form work true to line and level with accurate angles and surfaces.
- F. Fabricate connections that are exposed to weather in a manner that excludes water.
  - 1. Provide weep holes where water may accumulate.
  - 2. Locate weep holes in inconspicuous locations.
- G. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- H. Connections: Fabricate railings with welded connections unless otherwise indicated.

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- I. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
- J. Form changes in direction as follows:
  - 1. By bending or by inserting prefabricated elbow fittings.
- K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch (6 mm)** or less.
- N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
  - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.
  - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
  - 2. Coordinate anchorage devices with supporting structure.
- P. Fixed Railing Posts: For railing posts set in concrete, provide stainless steel sleeves not less than **6 inches (150 mm)** long with inside dimensions not less than **1/2 inch (13 mm)** greater than outside dimensions of post, with metal plate forming bottom closure.
- Q. **Make up wire-rope assemblies in the shop to field-measured dimensions with fittings machine swaged. Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount is available for tensioning wire ropes. Tag wire-rope assemblies and fittings to identify installation locations and orientations for coordinated installation.**

2.11 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
  - 1. Finish fabrications after assembly.

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2. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

B. Selections: As scheduled or as indicated in Design Selections.

## 2.12 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

1. Hot-dip galvanize steel railings, including hardware, after fabrication.
2. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
3. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
4. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

B. Shop Priming:

1. Shop Primer for Galvanized Steel: Apply shop primer formulated for exterior use over zinc-coated metal stair components.
  - a. Preparation: Comply with requirements of painting system, but not less than minimum requirements of SSPC-SP 16 surface preparation specifications
2. Shop Primer for Uncoated Surfaces: Apply shop primer to uncoated surfaces of metal stair components.
  - a. Preparation: Comply with requirements of painting system, but not less than minimum requirements of SSPC-SP 6/NACE No. 3 surface preparation specifications
  - b. Application: Comply with SSPC-PA 1, Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel, for shop painting.
    - 1) Primer need not be applied to surfaces to be embedded in concrete or masonry.
3. For non-galvanized-steel railings, provide non-galvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, hot-dip galvanize anchors to be embedded in exterior concrete or masonry.

C. Field-Applied Coatings: Paint all metal railings unless noted otherwise.

1. Painting: Comply with Division 09 Section Painting.

## 2.13 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. **Directional Finishes: Run grain of directional finishes with long dimension of each piece.**

**C. Directional Satin Finish: No. 4.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.
  1. For wall-mounted railings, verify locations of concealed reinforcement within gypsum board and plaster assemblies.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
  1. Respective manufacturer/fabricator's written installation instructions.
  2. Accepted submittals.
  3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.
  1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.3 PREPARATION

- A. General: Comply with manufacturer/fabricator's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION OF RAILINGS

- A. Perform cutting, drilling, and fitting required for installing railings.
  1. Fit exposed connections together to form tight, hairline joints.
  2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
  3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
  4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

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5. Set posts plumb within a tolerance of **1/16 inch in 3 feet (2 mm in 1 m)**.
6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet (6 mm in 3.5 m)**.

- B. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- C. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

### 3.5 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Fabrication Article, whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending **2 inches (50 mm)** beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within **6 inches (150 mm)** of post.

### 3.6 ANCHORING POSTS

- A. Anchoring Post into Concrete:
  1. Anchoring post: One of the following as indicated on Drawings:
    - a. Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
    - b. Form or core-drill holes not less than **5 inches (125 mm)** deep and **3/4 inch (20 mm)** larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
  2. Leave anchorage joint exposed with **1/8-inch (3-mm)** buildup, sloped away from post.
- B. Anchoring Post onto Concrete:
  1. Anchoring post: As follows and as indicated on Drawings:
    - a. Attach flange to concrete using post-installed anchors in pre-drill holes, welded or attached with set screws to post.
- C. Anchoring Posts onto Metal Surfaces:
  1. Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:
    - a. For steel railings, weld flanges to post and bolt to metal supporting surfaces.

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- b. For aluminum railings, attach posts as indicated, using fittings designed and engineered for this purpose.
- c. For stainless steel railings, weld flanges to post and bolt to supporting surfaces.

3.7 ATTACHING RAILINGS

- A. Attach handrails to walls with wall brackets, except where end flanges are used. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.
  - 1. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets to building construction as follows:
  - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger.
  - 2. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.
- C. Install railing gates level, plumb, and secure for full opening without interference.
  - 1. Attach hardware using tamper-resistant or concealed means.
  - 2. Adjust hardware for smooth operation.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency Field Service: The Owner may employ and pay a qualified independent testing agency to perform field quality control. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor's expense.

3.9 REPAIR

- A. Touchup Painting:
  - 1. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint.
    - a. Painting: Comply with Division 09 Section Painting.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

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SECTION 05 7000

ORNAMENTAL METAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Ornamental metal including formed metal used for general purposes and supplementary items necessary to complete their installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
  - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.
  - 1. Indicate materials and profiles of each ornamental formed metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.
- C. Samples for Verification: For each type of exposed finish required, prepared on 6 in (150 mm) square Samples of metal of same thickness and material indicated for the Work.
- D. Coordination Drawings: For ornamental metal elements that house items specified in other Sections. Show dimensions of housed items, including locations of housing penetrations and attachments, and necessary clearances.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with not less than 5 years of experience in the successful production and in-service performance of products and systems similar to scope of this Project.
- B. Installer Qualifications:
  - 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
  - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.

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- C. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up using materials indicated for the completed Work.
1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.
    - a. Show typical components, attachments to building structure, and requirements of installation.
  2. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
  3. Obtain Architect's acceptance of mock-ups before starting fabrication or installation.
  4. Acceptance of mock-ups does not constitute acceptance of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor and accepted by Architect in writing.
  5. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.5 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver ornamental metal products wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.
- B. Store products on elevated platforms in a dry location.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

### 2.2 METALS, GENERAL

- A. Metal Surfaces, General: Use materials with smooth, flat surfaces unless otherwise indicated. Use materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

### 2.3 ALUMINUM

- A. Fabricate products from alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- B. Bars and Shapes: **ASTM B 221 (ASTM B 221M)**, Alloy 6063-T5/T52.
- C. Plate: **ASTM B 209 (ASTM B 209M)**, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and considering Alloy 3003-H14 for coating finish, Alloy 5005-H32 for anodized finish, and Alloy 6061-T6 for high strength.
- D. Aluminum Sheet: Flat sheet complying with **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 strength and durability properties of Alloy 5005-H32.
- E. Perforated Metal Infill Panels (**MTL-02**): Aluminum sheet, **ASTM B209 (ASTM B209M)**, Alloy 6061-T6.

1. Basis of Design: As indicated or scheduled in Design Selections.

### 2.4 **STEEL AND IRON**

- A. **Perforated Metal Plate Wall Panels (MTL-02 ALTERNATE):**
- Joint Layout: As indicated on Drawings.**
  - Material: Corten Weathering Steel, gauge as required for panel size.**
  - Panel Width: As detailed.**
- B. **Fasteners: Stainless Steel fasteners OR Corten fasteners.**
- C. **Cor-ten or weathering steel unfinished mill material with no significant scratches or gouges.**

### 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

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1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
  - B. Sealants, Exterior: ASTM C 920; elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in ornamental formed metal and remain weathertight; and as recommended in writing by ornamental formed metal manufacturer.
  - C. Sealants, Interior: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834; of type and grade required to seal joints in ornamental formed metal; and as recommended in writing by ornamental formed metal manufacturer.
  - D. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.
    1. Provide concealed fasteners for interconnecting ornamental formed metal items and for attaching them to other work unless exposed fasteners are unavoidable or are the standard fastening method.
    2. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.
  - E. Nonstructural Anchors: Provide powder-actuated fasteners, metal expansion sleeve anchors, or metal-impact expansion anchors of type, size, and material necessary for type of load and installation indicated, as recommended by manufacturer, unless otherwise indicated.
  - F. Anchor Materials:
    1. Material for Interior Locations: Carbon-steel components zinc plated to comply with **ASTM B 633 or ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.
    2. Material for Exterior Locations and Where Stainless Steel Is Indicated: **Alloy Group 1 (A1)** stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**, and nuts, **ASTM F 594 (ASTM F 836M)**.
  - G. Backing Materials: Provided or recommended by ornamental formed metal manufacturer.
  - H. Isolation Coating: Manufacturer's standard alkali-resistant coating, bituminous paint, or epoxy coating.
- 2.6 PAINTS AND COATINGS
- A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- 2.7 FABRICATION, GENERAL
- A. Shop Assembly: Preassemble ornamental metal items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
  - B. Form ornamental metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.

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- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- D. Form simple and compound curves in bars, pipe, tubing, and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
- E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 in (0.8 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- F. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.
- G. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- H. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.
- I. Comply with AWS for recommended practices in shop welding and brazing. Weld and braze behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
  - 1. Where welding and brazing cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 Welds: no evidence of a welded joint.
- J. Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.
- K. Coordinate dimensions and attachment methods of ornamental metal items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- L. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a **1/2 in (12 mm)** wide hem on the concealed side, or ease edges to a radius of approximately **1/32 in (0.8 mm)** and support with concealed stiffeners.
- M. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use.
- N. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

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- O. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce ornamental formed metal items as needed to attach and support other construction.
- P. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install ornamental formed metal items.

## 2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. 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.

## 2.9 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Provide dry film thickness, primers, color coats and clear coats required to comply with performance requirements and warranty periods indicated.
  - 1. PVDF Fluoropolymer Finish: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.
  - 2. FEVE Fluoropolymer Finish: Fluoropolymer finish complying with AAMA 2605 and containing 100 percent fluorinated ethylene vinyl ether (FEVE) resin in color coat.
  - 3. Color: As scheduled or as indicated in Design Selections.
- C. Clear Anodic Finish for Exterior Units: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- D. Clear Anodic Finish for Interior Units: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
- E. Color Anodic Finish for Exterior Units: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
  - 1. Color: As scheduled or as indicated in Design Selections.
- F. Color Anodic Finish for Interior Units: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
  - 1. Color: As scheduled or as indicated in Design Selections.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
  - 1. Respective manufacturer/fabricator's written installation instructions.
  - 2. Accepted submittals.
  - 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION, ORNAMENTAL METAL

- A. Locate and place ornamental metal items level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install ornamental formed metal.
  - 1. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed to protect metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.
- D. Provide anchorage devices and fasteners where needed to secure ornamental metal to in-place construction.
- E. Perform cutting, drilling, and fitting required to install ornamental metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.

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- F. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of ornamental metal, restore finishes to eliminate evidence of such corrective work.
- G. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
- H. Install concealed gaskets, joint fillers, insulation, and flashings as work progresses.
- I. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.
  - 1. Retain protective coverings intact; remove coverings simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.
- J. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal arc welding and requirements for welding and for finishing welded connections in "Fabrication, General" Article. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- K. Field Brazing: Comply with requirements for brazing and for finishing brazed connections in "Fabrication, General" Article. Braze connections that are not to be left as exposed joints but cannot be shop brazed because of shipping size limitations.

3.5 ADJUSTING AND CLEANING

- A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

3.6 PROTECTION

- A. Protect finishes of ornamental formed metal items from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION

SECTION 06 4023

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Shop-finished interior architectural woodwork and supplementary items necessary for installation.

1.2 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.
- B. Exposed Surfaces, Semi-Exposed Surfaces, Concealed Surfaces, Types of Cabinet Construction, and other related terms are defined in referenced quality standards.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
  - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.
  - 1. Show details full size.
  - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
- C. Samples for Verification:
  - 1. Items with Plastic Laminate Finish:
    - a. Plastic laminates, 8 in by 10 in (200 mm by 250 mm), for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
  - 2. Simulated Stone Trim: 6 in (150 mm) long.
  - 3. Cabinets:
    - a. Corner Piece: Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 in (450 mm) high by 18 in (450 mm) wide by 6 in (150 mm) deep.

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- b. Cabinet Hardware and Accessories: Exposed cabinet hardware and accessories, one unit for each type and finish.
- c. Countertops: Section of countertop showing top, front edge, and backsplash construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.
- B. Qualification Data:
  - 1. For firms and persons specified in "Quality Assurance" to demonstrate their capabilities and experience. Include list of completed projects.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
  - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.
  - 3. Certification: Certified participant in AWI's Quality Certification Program or licensee of WI's Certified Compliance Program.
- B. Quality Standard: Unless otherwise indicated, comply with "Architectural Woodwork Standards" for standards and for grades of interior architectural woodwork indicated for construction, finish, installation and other requirements:
  - 1. Provide manufacturer certification indicating that woodwork complies with requirements of referenced quality standards.
  - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

1.6 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.7 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.

1.8 PROJECT CONDITIONS

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- 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 products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

## 1.9 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- B. Coordinate Shop Drawings and fabrication with hardware requirements.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

### 2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.
- B. Provide materials that comply with requirements of "Architectural Woodwork Standards" quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

### 2.3 MATERIALS

- A. Wood Products for Cabinets:
  - 1. Hardboard for Vertical Dividers Only: AHA A135.4, tempered, smooth two sides, 1/4 in (6 mm) minimum thickness unless indicated otherwise.
  - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD Exterior Glue, made with binder containing no added urea formaldehyde.
  - 3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no added urea formaldehyde.
  - 4. Softwood Plywood: DOC PS 1.

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- B. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
  - 1. Colors, Patterns, and Finishes:
    - a. Selections: As scheduled or as indicated in Design Selections.
- C. Simulated Stone Trim:
  - 1. Solid Surface Material: Homogeneous solid pieces of filled plastic resin complying with ANSI SS1.
  - 2. Colors, Patterns, and Finishes:
    - a. Selections: As scheduled or as indicated in Design Selections.

#### 2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
- B. Hinges: Provide number of hinges recommended by hinge manufacturer for size and weight of door.
- C. Butt Hinges: **2-3/4 in (69 mm)**, 5-knuckle steel hinges made from **0.095 in (2.4 mm)** thick metal, and as follows:
  - 1. Semi-concealed Hinges for Flush Doors: BHMA A156.9, B01361.
  - 2. Semi-concealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- D. Back-Mounted Pulls: BHMA A156.9, B02011.
- E. Catches: Magnetic catches, BHMA A156.9, B03141.
- F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- G. Shelf Rests: BHMA A156.9, B04013; metal.
  - 1. Product Standard: K & V No. 345, nickel plated.
- H. Drawer Slides: BHMA A156.9, B05091.
  - 1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
  - 2. Box Drawer Slides: Grade 1HD-100; for drawers not more than **6 in (150 mm)** high and **24 in (600 mm)** wide.
    - a. Product Standard for **24 in (600 mm)** Wide and Less: Full extension; Accuride "7434".
    - b. Product Standard for Wider than **24 in (600 mm)**: Full extension; Accuride "7432".

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3. File Drawer Slides: Grade 1HD-200; for drawers more than 6 in (150 mm) high or 24 in (600 mm) wide.
    - a. Product Standard for 42 in (1050 mm) Wide and Less: Full extension with 1 in (25 mm) over travel; Accuride "3640".
  4. Pencil Drawer Slides: Grade 1; for drawers not more than 3 in (75 mm) high and 24 in (600 mm) wide.
    - a. Product Standard for 16 in (400 mm) Wide and Less: Low profile, 75 lb (34 kg) load rating (at 2/3 travel), full extension; Accuride "2632".
    - b. Keyboard Slides: Grade 1HD-100; for computer keyboard shelves.
    - c. Product Standard for Slides Only, 16 in (400 mm) Wide and Less: Adjustable height, 75 lb (34 kg) load rating; Accuride "2109".
    - d. Product Standard for Slides and Tray: Fixed tilt, adjustable height; Accuride "Cbergo-Tray 200".
    - e. Product Standard for Slides, Tray and Accessories: Adjustable tilt, adjustable height, cable management, palm rest, and mouse pad; Accuride "Cbergo-Tray 300".
  5. Trash Bin Slides: Grade 1HD-200; for trash bins not more than 20 in (500 mm) high and 16 in (400 mm) wide.
- I. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.
  - J. Door Locks: BHMA A156.11, E07121.
    1. Product Standard: K & V No. 984, nickel plated. All locks to be keyed to District's master keying system.
  - K. Drawer Locks: BHMA A156.11, E07041.
    1. Product Standard: K & V No. 986, nickel plated. All locks to be keyed to District's master keying system.
  - L. Grommets for Cable Passage through Countertops: Molded-plastic grommets and matching plastic caps with slot for wire passage.
    1. Size: 1-1/4 in (32-mm) or 2 in (50 mm) OD as indicated.
    2. Color: As indicated.
    3. Product Standards: Doug Mockett & Company, Inc "OG or SG Series" or Hafele 429.93.
  - M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
    1. Satin Stainless Steel: BHMA 630, unless otherwise indicated.
  - N. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

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O. Manufacturers:

1. Accuride.
2. Julius Blum, Inc.
3. The Engineered Products Company.
4. Grass America, Inc.
5. Hafele America Company.
6. Hettich America Corporation.
7. Knape & Vogt Manufacturing Company (K & V).
8. Stanley Hardware, Division of the Stanley Works.

P. Cabinet Accessories:

1. Counter Support Brackets: Unless noted otherwise, provide brackets factory-primed for field painting.
  - a. Manufacturers and Products:
    - 1) A&M Hardware, Inc.; Work Station Brackets.
    - 2) Rakks/Rangine Corporation; Counter Support Brackets, EH Series.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood 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:
  1. General: As recommended by woodwork fabricator to suit application.
  2. 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) unless indicated otherwise:
    - a. Wood Glues: 30 g/L.
    - b. Contact Adhesive: 250 g/L.
  3. Adhesive for Bonding Plastic Laminate Faces and Edges: PVA as recommended by woodwork fabricator to suit application.

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- D. Hanging Clips: Provide manufacturer's standard nonferrous-metal or hot-dip galvanized zee hanging clips.

## 2.6 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Premium Grade interior woodwork complying with referenced quality standard.
- 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 in (19 mm)** Thick or Less: **1/16 in (1.5 mm)**.
  - 2. Edges of Rails and Similar Members More Than **3/4 in (19 mm)** Thick: **1/8 in (3 mm)**.
- D. Complete fabrication, including assembly, finishing, 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.
  - 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
  - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- 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.

## 2.7 PLASTIC-LAMINATE CABINETS

- A. Grade: Premium.
- B. AWI Type of Cabinet Construction: Flush overlay unless indicated otherwise.
- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
  - 1. Horizontal Surfaces Other Than Tops: Grade HGP, **.038 in (1 mm)** thick.
  - 2. Postformed Surfaces: Grade HGP, **.038 in (1 mm)** thick.
  - 3. Doors and Vertical Surfaces: Grade VGS, **.028 in (0.7 mm)** thick.
  - 4. Edges: PVC Edge Banding, **0.12 in (3 mm)** thick, matching laminate in color, pattern, and finish.

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- D. Semi-exposed Surfaces: Provide surface materials indicated below:
1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade CLS, .020 in (0.5 mm) thick.
  2. Edges: PVC Edge Banding, .038 in (1 mm) thick, matching laminate in color, pattern, and finish.
  3. Drawer Sides, Backs and Sub-Fronts: 3/4 in (18 mm) minimum thickness, as indicated.
    - a. Solid-hardwood lumber.
  4. Drawer Bottoms: 1/4 in (6 mm) minimum thickness, as indicated.
    - a. Hardwood plywood with veneer core.
  5. Drawer Box Construction: One of the following:
    - a. Glued multiple dovetail.
    - b. Glued French dovetail.
    - c. Glued and doweled.
  6. Interior Drawer Box Finish, as indicated:
    - a. Clear catalyzed polyurethane.
- E. Body Members (Ends, Divisions, Bottoms and Sub-Tops): Medium-density fiberboard, 3/4 in (19 mm) minimum thickness.
- F. Face Frames, Rails, Kicks: Solid-hardwood lumber or hardwood plywood, 3/4 in (19 mm) thick minimum thickness.
- G. Cabinet bases shall be treated 2 x 4 material.
- H. Shelves: Hardwood plywood with veneer core with the following thickness:
1. For Spans Up To 32 in (800 mm): 3/4 in (19 mm).
  2. For Spans Up To 42 in (1050 mm): 1 in (25 mm).
- I. Drawer Fronts: Medium density fiberboard, 3/4 in (19 mm) thick minimum thickness.
- J. Doors:
1. Hinged Flush Type: Medium density fiberboard with minimum thickness of 3/4 in (19 mm).
    - a. Maximum cabinet door size: 24 in (600 mm) width and 84 in (2100 mm) height.
- K. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL, .020 in (0.5 mm) thick.
- L. Concealed Edges of Base Cabinet Panels: Including but not limited to floors, vertical edges, splashes and countertops; Clear Catalyzed Polyurethane.

**2.8 PLASTIC-LAMINATE COUNTERTOPS (ALTERNATE)**

- A. Grade: Premium.
- B. High-Pressure Decorative Laminate Grade:
  - 1. High-Pressure Decorative Laminate Grade for Flat Countertops: Grade HGS, .048 in (1.2 mm) thick.
  - 2. High-Pressure Decorative Laminate Grade for Post-formed Countertops: Grade HGP, .038 in (1.0 mm) thick.
- C. Grain Direction for Wood Grain Laminates: Parallel to cabinet fronts.
- D. Edge Treatment: PVC edge banding, 0.12 in (3 mm) thick, matching laminate in color, pattern, and finish, as indicated.
- E. Core Material for Countertops: Medium-density fiberboard, moisture resistant, binder containing no added urea formaldehyde, 3/4 in (19 mm) thick minimum thickness.
- F. Core Material for Side and Back Splashes: Medium-density fiberboard, moisture resistant, binder containing no added urea formaldehyde, 1/2 in (12 mm) thick minimum thickness.
- G. Backer Sheet: Provide plastic-laminate backer sheet, Grade BKL, .020 in (0.5 mm) thick, on underside of countertop substrate.
- H. Concealed Backs and Edges at Side and Back Splashes: High-pressure decorative laminate, Grade BKL, .020 in (0.5 mm) thick.

**2.9 SOLID SURFACING COUNTERTOPS**

- A. Refer to Division 12 Section "Simulated Stone Countertops".

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive interior architectural woodwork and associated work to which interior architectural woodwork will be applied for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

### 3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
  - 1. Quality standards. (The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.)
  - 2. Respective manufacturer/fabricator's written installation instructions.
  - 3. Accepted submittals.
  - 4. Contract Documents.

### 3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

### 3.4 INSTALLATION

- A. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication, to extent that it was not completed in the shop.
- B. 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 in per 96 in (3 mm per 2400 mm)**.
- C. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts. **Do not install floor covering under base cabinets.**
- D. Anchor woodwork to anchors or 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.

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- E. Cabinets, General: 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 in per 96 in (3 mm per 2400 mm)** sag, bow, or other variation from a straight line.
- F. Base and Wall Cabinets: Set base cabinets straight, level, and plumb. Adjust subtops within **1/16 in (1.5 mm)** of a single plane. Fasten base cabinets to partition framing, or reinforcements in partitions with fasteners spaced **24 in (600 mm)** on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced **24 in (600 mm)** on center. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
  2. Wall Cabinets: Fasten wall cabinets through back, near top and bottom, at ends and not more than **16 in (400 mm)** on center with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish or toggle bolts through metal backing or metal framing behind wall finish.
- G. **Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.**
1. **Where possible make field jointing in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.**
  2. **Plastic Laminate Countertops: Secure field joints in plastic-laminate countertops with concealed clamping devices located within **6 in (150 mm)** of front and back edges and at intervals not exceeding **24 in (600 mm)**. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.**
  3. **Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.**
  4. **Simulated Stone Countertops: Refer to Division 12 Section "Simulated Stone Countertops".**
  5. **Install countertops with no more than **1/8 in per 96 in (3 mm per 2400 mm)** sag, bow, or other variation from a straight line.**
  6. **Secure backsplashes to tops with concealed metal brackets at **16 in (400 mm)** on center and to walls with adhesive.**
  7. **Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants".**

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- H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.5 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.

END OF SECTION

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SECTION 07 4213

FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Factory-formed metal wall panels and supplementary items necessary for installation.
- B. Related Requirements:
  - 1. Refer to Division 01 Section Field Test for Air and Water Leakage.

1.2 DEFINITIONS

- A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, and supplementary items necessary for a complete weathertight wall system.

1.3 DELEGATED ENGINEERING REQUIREMENTS

- A. Contract Documents Design Intent: Drawings and Specifications indicate design intent for products and systems and do not necessarily indicate or specify total Work required. Contract Documents shall not be construed as an engineered design; furnish and install all Work required for a complete installation.
- B. Delegated Engineering Responsibility: Contractor shall employ a qualified professional engineer to provide engineering for products and systems including attachment to building structure required to meet design intent of Contract Documents.
  - 1. Preparation of structural analysis data including engineering calculations, shop drawings and other submittals signed and sealed by the qualified professional engineer.
- C. Delegated Engineering Professional Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated for products and systems similar to this Project and has a record of successful in-service performance.
- D. Coordination of Work:
  - 1. Product Variations: In the event of minor differences between products and systems of acceptable or available manufacturers, Contractor shall notify Architect of such differences and resolve conflicts in a timely manner. Failure of Contractor to provide notification shall be construed as acceptance of conditions indicated, and changes caused by minor differences between products and Contract Documents shall be included in the Work at no additional cost to Owner.

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2. Allowable Adjustments: Minor dimension and profile adjustments may be made in interest of fabrication or erection methods or techniques or ability to satisfy design intent, provided design intent is maintained as determined by Architect. Proposed deviations shall include a detailed analysis of impact to adjacent substrates or other building systems, including related design or construction cost impacts. If accepted by Architect, deviations causing changes in materials, constructability, substrates, or conditions shall be included in the Work at no additional cost to Owner.

1.4 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
  1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work. Include the following:
  1. Show fabrication and installation layouts of metal wall panels.
  2. Show details and locations of edge conditions, side-seam and end-lap joints, panel profiles, corners, anchorages, trim, flashings, closures, and terminations.
  3. Show details for securing metal wall panel assembly, including layout of fasteners and other attachments.
  4. Show details of wall panel penetrations.
  5. Show details of connections to adjoining work.
  6. Indicate where and how the system deviates from Contract Documents.
  7. Shop drawings shall contain seal of a professional engineer currently registered in licensing jurisdiction of the project and a written statement that the framing system conforms to project requirements, applicable codes, and specified conditions.
  8. Provide for information only, material properties and other information needed for structural analysis including computations, prepared, signed, or, and sealed by a professional engineer licensed to practice in the jurisdiction where the project is located.
  9. Submittal shall contain statement explaining how proposed system design will accommodate infiltrated and condensate water.
  10. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- C. Samples for Verification Purposes: For each type of exposed finish required, prepared on samples of size indicated below.
  1. Metal Wall Panels: 12 in (300 mm) long by actual panel width. Include fasteners, closures, and other metal wall panel accessories.
  2. Trim and Closures: 12 in (300 mm) long. Include fasteners and other exposed accessories.
  3. Accessories: 12 in (300 mm) long samples for each type of accessory.
  4. Exposed Sealants: For each type and color of joint sealant required. Install joint sealants in 1/2 in (12 mm) wide joints formed between two 6 in (150 mm) long strips of material matching the appearance of metal-faced composite wall panels adjacent to joint sealants.

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1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Project Acceptance Document: Certification by the manufacturer that its products and systems are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.
- B. Delegated Engineering Calculations: Informational submittal for products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation; test reports are not acceptable substitute for calculations.
- C. Field Quality Control Reports: Written report of testing and inspection required by Field Quality Control.
- D. Warranty:
  - 1. Provide manufacturer's written warranty covering materials and installation (labor) stating obligations, remedies, limitations and exclusions.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
  - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.
  - 3. Manufacturer Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer to install products.

1.8 MOCKUPS

- A. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up using materials indicated for the completed Work.
  - 1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.
    - a. Show typical components, attachments to building structure, and requirements of installation.
  - 2. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
  - 3. Obtain Architect's acceptance of mock-ups before starting fabrication or installation.

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4. Acceptance of mock-ups does not constitute acceptance of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor and accepted by Architect in writing.
5. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.

1.9 PRE-INSTALLATION CONFERENCE

A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1. Participants:
  - a. Architect.
  - b. Contractor, including superintendent.
  - c. Installer, including project manager and supervisor.
  - d. If requested, Manufacturer's qualified technical representative.
  - e. Installers of other construction interfaced with Work.
2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
  - a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
  - b. Review Contract Document requirements.
  - c. Review approved submittals.
  - d. Review inspection and testing requirements.
  - e. Review environmental conditions and procedures for coping with unfavorable conditions.
  - f. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.
3. Record discussions, including decisions and agreements, and prepare report.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.
- B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal wall panel for period of metal wall panel installation.

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1.11 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturer's written instructions and warranty requirements.
- B. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.12 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

1.13 WARRANTY

- A. Manufacturer's Warranty: Furnish manufacturer written material and labor warranty signed by an authorized representative using manufacturer's standard form agreeing to furnish materials and labor required to repair or replace work which exhibits material defects caused by manufacture or design and installation of product. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

1. Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
- b. Noise or vibration created by wind and thermal and structural movements.
- c. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Manufacturer shall warrant the products to be free from material and labor Defects for a period of 5 years from date of Substantial Completion

- B. Installer's Warranty: Furnish installer written workmanship warranty signed by an authorized representative using installer's standard form agreeing to provide labor required to repair or replace work which exhibits workmanship defects. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

1. Warranty Period: Installer shall warrant the installation to be free from workmanship Defects for a period of 2 years from date of Substantial Completion.

- C. Factory Applied Finish Warranty for Fluoropolymer Finishes: Furnish manufacturer written warranty signed by an authorized representative using manufacturer's standard form agreeing to repair finish or replace work which exhibits finish defects. "Defects" is defined to include but not limited to deterioration or failure of finish to perform as required.

1. Coverage includes, but is not limited to, the following:

- a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: Manufacturer shall warrant the installation to be free from finish defects for a period of 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
1. American Building Components.
  2. ATAS International, Inc.
  3. Berridge Manufacturing Company.
  4. Kalzip.
  5. Kingspan.
  6. CENTRIA Architectural Systems.
  7. MBCI
  8. Pac-Clad
  9. VM Building Solutions USA Inc.
- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

### 2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

### 2.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of products and systems representing those indicated for this Project, without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Loads: Engineer products and systems to withstand loads within limits of allowable working stresses of the materials involved under conditions indicated including, but not limited to gravity, wind, seismic, and erection design loads and thermal movements established by authorities having jurisdiction, applicable building codes, and as indicated.
1. Wind Loads: As indicated on Drawings or Wind Analysis Report.
  2. Other Loads: As indicated on Drawings.
- C. Structural Movement: Engineer system to withstand movements of supporting structure including, but not limited to inter-story drift, twist, column shortening, long-term creep and deflection from uniformly distributed and concentrated live loads:
1. Live Load Deflection: Accommodate differential vertical deflection of floors:
    - a. Deflection: As indicated on Drawings.
  2. Inter-story Drift: Accommodate inter-story drift between adjacent floors perpendicular and/or parallel to the wall:

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- a. Design Displacement: As indicated on Drawings.
- D. Seismic Performance: Systems shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7, the building code and authorities having jurisdiction.
- E. Deflection of Framing Members and Panels: At design wind pressure.
  1. Deflection of Framing Members Normal to Wall Plane (Panel Perimeter): Limited to 1/175 of clear span.
  2. Deflection of Panels: For short side panel edge dimension (L), limit center-of-panel deflection to not greater than L/100 or 1 in (25mm), whichever is less.
- F. Structural-Test Performance: Provide metal wall panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592 or ASTM E 330 as follows:
  1. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of the clear span.
- G. Water Penetration under Static Pressure: Test in accordance with ASTM E 331 as follows:
  1. No evidence of water penetration for the system when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sf (300 Pa).
- H. Energy Performance:
  1. Air Leakage: Test in accordance with ASTM E 283 as follows:
    - a. Air leakage for the system of not more than 0.06 cfm/sf (0.30 L/s/sm) at a minimum static-air-pressure differential of 6.24 lbf/sf (300 Pa) when tested in accordance with ASTM E 283.
- I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
  1. Temperature Change (Range): 120 deg F (49 deg C), ambient; 180 deg F (82 deg C), material surfaces.
  2. Thermal Cycling: No buckling, damaging stresses, damaging loads on fasteners, and other detrimental effects.
- J. Dimensional Tolerances: Engineer products and systems to accommodate dimensional tolerances of framing members and adjacent construction.

## 2.4 METAL WALL PANEL MATERIALS

- A. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

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1. Surface: Smooth, flat.
2. Exterior Finish: Fluoropolymer finish.
3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of **0.5 mils (0.013 mm)**.

**2.5 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS**

- A. **General: Provide factory-formed metal wall panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.**
- B. **Corrugated-Profile, Exposed-Fastener Metal Wall Panels (MTL01 ALTERNATE): Formed with alternating curved ribs spaced at **2.67 in (68 mm)** on center across width of panel.**
1. **Basis of Design: CENTRIA; Econolap**
  2. **Material: Zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet, standard of manufacturer; 22 gage, **0.034 in (0.8 mm)** nominal minimum thickness.**
  3. **Panel Coverage: **34-2/3 in (880 mm)**.**
  4. **Panel Height: **3/4 in (19 mm)**.**

**2.6 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS**

- A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile, Concealed-Fastener Metal Wall Panels (**MTL-01**): Formed with vertical panel edges and flat panel between panel edges; with flush joint between panels.
1. Basis of Design: Pac-Clad; Flush Wall Panels.
  2. Material: Zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet, standard of manufacturer; 22 gage, **0.034 in (0.8 mm)** nominal minimum thickness.
  3. Panel Coverage: **7 in (178 mm) and 12 in (300 mm)**.
  4. Panel Height: **1 in (25 mm)**.
- C. Reveal-Joint, Concealed-Fastener Metal Wall Panels (**MTL-01**): Formed with vertical panel edges and flat pan between panel edges; with narrow reveal joint between panels.
1. Basis of Design: Pac-Clad; Reveal Wall Panels.
  2. Material: Zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet, standard of manufacturer; 22 gage, **0.034 in (0.8 mm)** nominal minimum thickness.
  3. Panel Coverage: **7 in (178 mm) and 12 in (300 mm)**.
  4. Reveal Joint: **1-1/2 in (38 mm)** wide.
  5. Panel Height: **1 in (25 mm)**.

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- D. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Panels (**MTL-01 ALTERNATE**): Formed with vertical ribs at panel edges and flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and mechanically seaming panels together.
1. Basis of Design: VM Building Solutions; Standing Seam Panels.
  2. Metal Sheet Material:
    - a. Zinc sheet.
  3. Panel Coverage: 16 inches (406 mm) nominal, unless indicated otherwise.
  4. Panel Height: 1 inches (25 mm) nominal, unless indicated otherwise.

## 2.7 SUBFRAMING AND PANEL ACCESSORIES

- A. Metal Subframing and Furring: Provide manufacturer standard sections as required for support and alignment of metal panel system.
1. Sub-girts, Zee Clips, Base or Sill Angles or Channels: Manufacturers standard C, U or Z-shaped sections, type as recommended by panel manufacturer.
    - a. Metallic Coated Steel Sheet: ASTM A792/A792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation.
      - 1) Thickness: Not less than 0.063 inch, 16 gauge nominal thickness.
- B. Fasteners for Sub-framing and Furring: Self-tapping screws, bolts, nuts, and other suitable fasteners, Series 300 stainless steel of size, corrosion resistance, holding power, and other properties required to comply with performance requirements.
1. Provide fasteners with EPDM or PVC sealing washers.
- C. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures fabricated of same metal as metal wall panels.
  2. Closure Strips: Closed-cell, expanded, cellular, rubber or cross-linked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1 in (25 mm) thick, flexible closure strips; cut or pre-molded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
  3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
- D. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

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- E. Panel Fasteners: Self-tapping screws, bolts, nuts, and other suitable fasteners, Series 300 stainless steel of size, corrosion resistance, holding power, and other properties required to comply with performance requirements. Provide exposed fasteners with heads matching color of metal panels factory-applied coating.
1. Provide fasteners with EPDM or PVC sealing washers.
- F. Panel Sealants: Provide the following as recommended by metal wall panel assembly manufacturer for installation indicated.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape **1/2 in (12 mm)** wide and **1/8 in (3 mm)** thick.
  2. Elastomeric Joint Sealant: ASTM C 920; elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal exposed joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for concealed hooked-type expansion joints with limited movement.
- G. Self-Adhering, High-Temperature Rubberized Asphalt Flashing: Minimum **30 mils to 40 mils (0.76 mm to 1.00 mm)** thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at **240 deg F (116 deg C)**.
  2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus **20 deg F (-6.7 deg C)**.
  3. Manufacturers and Products:
    - a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
    - b. GCP Applied Technologies; Ultra.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Metal-Fab Manufacturing, LLC; MetShield.
    - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- H. Barrier Flashing Tape: Air-barrier manufacturer standard adhesive and pressure-sensitive adhesive tape. Refer to Division 07 Section "Air and Water Barriers".

## 2.8 FABRICATION

- A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

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- C. Fabricate metal wall panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, and that will minimize noise from movements within panel assembly.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 4. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
  - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.
    - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

## 2.9 FINISHES

- 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.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of accepted 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 accepted Samples and are assembled or installed to minimize contrast.
- D. Finish Selections: As scheduled or indicated in Design Selections.

## 2.10 STEEL FINISHES

- A. Fluoropolymer Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions. Provide dry film thickness, primers, color coats and clear coats required to comply with performance requirements and warranty periods indicated.
  - 1. PVDF Fluoropolymer Finish: Fluoropolymer finish complying with AAMA 621 and containing not less than 70 percent PVDF resin by weight in color coat.

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2. FEVE Fluoropolymer Finish: Fluoropolymer finish complying with AAMA 621 and containing 100 percent fluorinated ethylene vinyl ether (FEVE) resin in color coat.

## 2.11 ZINC FINISHES

- A. Zinc Sheet: Zinc, 99 percent pure, alloyed with a maximum of 1 percent copper and titanium; with manufacturer's standard factory-applied, flexible, protective back coating.
  1. Thickness: 0.032-inch (0.81-mm) unless otherwise indicated.
  2. Surface: Smooth, flat finish.
  3. Finish: Bright rolled.
  4. Finish: Pre-weathered gray.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.
  1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
  2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
  3. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before installation.

### 3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
  1. Respective manufacturer's written installation instructions.
  2. Accepted submittals.
  3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

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3.3 PREPARATION

- A. General: Comply with manufacturer instructions, recommendations and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Subframing and Supports: Install subframing, subgirts, base angles, closure channels, sills, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal composite material panel manufacturer's written recommendations.

3.4 ASSEMBLY INSTALLATION

- A. General: Install metal wall panels according to manufacturer written instructions in orientation, sizes, and locations indicated on Drawings.
- B. Wall Panels: Install wall panels perpendicular to girts and subgirts unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Shim or otherwise plumb substrates receiving metal wall panels.
  - 2. Flash and seal metal wall panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather barrier and flashings that will be concealed by metal wall panels are installed.
  - 3. Install screw fasteners in predrilled holes.
    - a. Air and Water Barrier: Install a strip of barrier flashing tape behind through-wall attachments that penetrate air and water barrier. Seal all penetrations with weather barrier sealant.
  - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 5. Install flashing and trim as metal wall panel work proceeds.
  - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  - 7. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete and elsewhere as indicated or, if not indicated, as necessary for waterproofing.
  - 8. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  - 9. Provide weathertight escutcheons for pipe and conduit penetrating exterior walls.
- C. Fasteners: Use stainless-steel fasteners.
- D. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
- E. Attachment Assembly, General: Install attachment assembly required to support metal wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
  - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

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2. Do not begin installation until weather barrier and flashings that will be concealed by panels are installed.

F. Lap-Seam Metal Wall Panels: Fasten metal wall panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal wall panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Provide sealant tape at lapped joints of metal wall panels and between panels and protruding equipment, vents, and accessories.
6. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps; on side laps of nesting-type panels; on side laps of corrugated nesting-type, ribbed, or fluted panels; and elsewhere as needed to make panels weathertight.
7. At panel splices, nest panels with minimum 6 in (150 mm) end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.

G. Standing-Seam Metal Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners according to metal roof panel manufacturer's written instructions.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

H. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.

1. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants".

### 3.5 METAL SOFFIT PANEL INSTALLATION

A. In addition to complying with requirements in "Wall Panel Assembly Installation" Article, install metal soffit panels to comply with requirements in this article.

B. Metal Soffit Panels: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.

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1. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.

C. Metal Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

### 3.6 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

a. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in weathertight and weather-resistant performance.

a. Install escutcheons for pipe and conduit penetrating exterior walls.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft (3 m) with no joints allowed within 24 in (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and weathertight, form expansion joints of intermeshing hooked flanges, not less than 1 in (25 mm) deep, filled with mastic sealant (concealed within joints).

### 3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Manufacturer qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.

1. Manufacturer Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.

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B. Testing Agency: The Owner may employ and pay a qualified independent testing agency to perform field quality control. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor expense.

1. Refer to Division 01 Section Field Test for Air and Water Leakage.

C. Metal panels will be considered defective if they do not pass test and inspections.

D. Prepare test and inspection reports.

3.8 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.

B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 09 6500

RESILIENT FLOORING (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Resilient flooring products and systems and supplementary items necessary for installation.
  - 1. Resilient tile flooring.
- B. Related Section:
  - 1. Resilient wall base, reducer strips, and other accessories installed with resilient flooring are specified in Division 09 Section "Resilient Base and Accessories".

1.2 ALLOWANCES

- A. Concrete Moisture Barrier Allowance: Include allowance to provide Concrete Moisture Barrier Floor Treatment to concrete floor decks.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
  - 1. Include manufacturer's specifications for materials, finishes, recommended adhesives, construction details, installation instructions, and recommendations for maintenance.
- B. Product Schedule: Use same designations indicated on the Finish Schedule and Drawings.
- C. Samples for Verification Purposes: In manufacturer's standard size, but not less than **6 in by 9 in (150 mm by 230 mm)** sample of each different color and pattern of resilient flooring product specified, showing the full range of variations expected in these characteristics. Label each sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in Schedules.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required.
  - 1. Product Compatibility: On installations incorporating products provided by more than one manufacturer, each manufacturer's certificate shall include specific reference to and approval of the other manufacturer's products.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Include in operation and maintenance manual as required by

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Division 01 Section "Closeout Procedures". Submit manufacturer's instructions for maintenance of installed work, including methods and frequency for maintaining optimum condition under anticipated use. Include precautions against cleaning materials and methods which may be detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Slip Resistance: Provide products identical to those tested for slip resistance per ASTM D 2047 with a static coefficient of friction not less than 0.6 for level surfaces and 0.8 for ramped surfaces.
- B. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux: Class I, 0.45 W/sq. cm or greater when tested per ASTM E 648.
  - 2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.7 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store flooring products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C).
  - 1. Resilient Tile Flooring: Store floor tiles on flat surfaces.

1.9 PROJECT CONDITIONS

- A. Unless otherwise approved in writing by the manufacturer, do not begin flooring installation unless permanent building HVAC system is operational and capable of maintaining relative humidity and temperature of not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C) for at least 48 hours before installation, during installation, and after installation.
  - 1. Maintain relative humidity of not more than the designed relative humidity for spaces to receive flooring.
- B. Maintain flooring products prior to installation at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during flooring installation and for time period after installation recommended by manufacturer.
- D. Install flooring products after other finishing operations, including painting, have been completed.

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- E. Do not install flooring over concrete substrates until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended tests. Refer to "Preparation" Article for requirements.

1.10 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

- 1. Selections: As scheduled or as indicated in Design Selections.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 RESILIENT TILE FLOORING MATERIALS

- A. Vinyl Composition Floor Tile Standard: ASTM F 1066, Class 2, through-pattern tile, unless otherwise indicated.

- 1. Size: 12 in by 12 in by 0.125 in (300 mm by 300 mm by 3 mm).

2.4 ACCESSORY MATERIALS

- A. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by flooring manufacturer for products and applications indicated.
- C. Adhesives: Water-resistant type recommended by flooring manufacturer suitable for products, applications, and substrate conditions indicated.
  - 1. Product Compatibility: Provide Manufacturer's written recommendation for each product within an assembly. On installations incorporating products provided by more than one manufacturer, each manufacturer shall approve in writing all adhesives that are in contact with their products.

- D. Concrete Moisture Barrier Floor Treatment:

- 1. Epoxy-Based Moisture Barrier Floor Treatment: Two-component, high-performance,

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non-flammable, rapid drying, water based, low odor, low VOC, two-component, penetrating epoxy; formulated to reduce moisture vapor transmission and surface alkalinity from concrete substrates, including aged or freshly placed ("green") concrete, prior to installation of impervious glued-down finish flooring specified in other Division 09 sections.

- a. Basis of Design (Product Standard): Bostik, Inc.; D-250.
2. Cementitious Overcoat: Fast-setting latex-fortified Portland cement skim coating intended for interior uses.
    - a. Basis of Design (Product Standard): Bostik, Inc.; Webcrete 95.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

#### 3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
  1. Respective manufacturer's written installation instructions.
  2. Accepted submittals.
  3. Contract Documents.

#### 3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  1. Verify that concrete substrate finishes comply with requirements specified in Division 03 Section "Concrete Finishing" for concrete substrates receiving resilient flooring.
  2. Verify that concrete substrates are free of cracks, ridges, depressions, scale, and foreign deposits.
  3. Verify that concrete substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Unless concrete has been water-cured, then proceed with the following:
    - a. Bead-blast concrete substrate with an apparatus that abrades the surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum

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- pickup.
- b. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.
4. Determine adhesion and dryness characteristics by performing the following tests as recommended by flooring manufacturer.
  5. Alkalinity and Adhesion Testing: Perform tests recommended by flooring manufacturer. A pH range of 5 to 9 is required when substrate is wetted with distilled water and pHDrion paper is applied. Proceed with installation only after concrete substrates pass testing.
  6. Moisture Testing: Perform one or both of the following tests as recommended by flooring manufacturer. Perform 3 moisture tests for first 1000 sf (92.9 sm) of concrete substrate scheduled to receive flooring and 1 test for each additional 1000 sf (92.9 sm) or fraction thereof. Proceed with installation only after concrete substrates pass testing.
    - a. Perform anhydrous calcium chloride test in accordance with ASTM F 1869. Proceed with installation only after concrete substrates have maximum moisture-vapor-emission rate of 3 lbs of water/1000 sf (1.36 kg of water/92.9 sm) in 24 hours.
    - b. Perform relative humidity test using in situ probes in accordance with ASTM F 2170. Proceed with installation only after concrete substrates have a maximum 75 percent relative humidity level measurement.
  7. Moisture Barrier Floor Treatment: For concrete substrates not meeting moisture test standards specified above, apply epoxy-based moisture floor treatment and cementitious overcoat to concrete substrate in accordance with manufacturer's written instructions.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
  - D. Broom and vacuum clean substrates to be covered immediately before flooring product installation. After cleaning, reexamine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.
- ### 3.4 INSTALLATION OF RESILIENT FLOORING, GENERAL
- A. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.
  - B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
  - C. Extend flooring into toe spaces, door reveals, closets, and similar openings. Extend flooring to center of door openings.
  - D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on substrate. Use chalk or other nonpermanent, non-staining marking device.
  - E. Adhere flooring to substrates using a full spread of adhesive applied to substrate to comply with flooring manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.

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1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

F. Hand-roll flooring in both directions from center out to embed flooring in adhesive and eliminate trapped air according to manufacturer's written instructions. At walls, door casings, and other locations where access by roller is impractical, press flooring firmly in place with flat-bladed instrument.

### 3.5 INSTALLATION OF RESILIENT TILE FLOORING

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles square with room axis, unless otherwise indicated.

2. Lay tiles with grain running in one direction, unless otherwise indicated.

### 3.6 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing flooring products:

1. Remove adhesive and other surface blemishes from exposed surfaces using cleaner recommended by flooring manufacturer.

2. Sweep or vacuum floor thoroughly.

3. Do not wash floor until after time period recommended by flooring manufacturer.

4. Damp-mop floor to remove marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by flooring manufacturer.

1. Cover products installed on floor surfaces with undyed, untreated building paper until just prior to Substantial Completion.

2. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

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SECTION 14 2400

HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Pre-engineered hydraulic elevators and supplementary items necessary to complete their installation.
  - 1. Hydraulic passenger elevators.
  - 2. Designated stretcher elevator complying with code requirements for stretcher.
- B. Related Requirements: Including but not limited to the following:
  - 1. Division 05 Section "Structural Steel Framing" for the following:
    - a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
    - b. Divider beams.
    - c. Hoist beams.
    - d. Structural-steel shapes for subsills.

1.2 PRODUCT VARIATIONS AND ADJUSTMENTS

- A. Product Variations: In the event of differences between products and systems of acceptable or available manufacturer/fabricators, Contractor shall notify Architect of such differences and resolve conflicts prior to awarding Contract. Failure of Contractor to provide notification shall be construed as acceptance of conditions indicated, and changes caused by differences between products and Contract Documents shall be included in the Work at no additional cost to Owner.
- B. Adjustments: Proposed deviations shall include a detailed analysis of impact to adjacent substrates, structural, mechanical, electrical or other building systems, including related design or construction cost impacts. Deviations causing changes in materials, constructability, substrates, systems or conditions shall be included in the Work at no additional cost to Owner.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.
- B. Service Elevator: A passenger elevator that is also used to carry freight.
- C. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

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1.4 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
  2. Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work:
1. Include large-scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment.
    - a. Include machine room layout, required clearances and equipment isolation details.
    - b. Include large-scale layout of car-control station.
  2. Indicate maximum dynamic and static loads imposed on building structure at points of support as well as maximum and average power demands.
  3. Indicate variations from specified requirements.
- C. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes, **3-inch- (75-mm-)** square Samples of sheet materials and **4-inch (100-mm)** lengths of running trim members.
1. Signal Equipment and Fixtures: Architect shall select and approve all fixture selections from Manufacturer's premium fixtures.

1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room or control closet layout and dimensions, as shown on Drawings, and electrical service including standby power generator if applicable, as shown and specified, are adequate for elevator system being provided.
- B. Field Quality Control Reports: Written report of testing and inspection required by "Field Quality Control".
- C. Warranty:
1. Provide manufacturer's written warranty covering materials and installation (labor) stating obligations, remedies, limitations and exclusions.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.

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1. Diagnostic Test Equipment and Instructions: Submit manufacturer's/installer's standard operation and maintenance manual, in accordance with ASME A17.1/CSA B44.
    - a. Provide all diagnostic test devices including one set of supporting information required to interpret test data and troubleshoot system.
  2. Maintenance: Vertical transportation system shall be designed such that the installation can be maintained by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment manufacturer.
  3. Keys: Provide four sets of keys to operate all keyed switches and locks.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal:
1. Submit a continuing full-service maintenance proposal from Installer to Owner, in the form of a standard five-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications:
1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar in scope of this Project.
  2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar in scope of this Project.
  3. Manufacturer Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer to install products.
- 1.8 PRE-INSTALLATION CONFERENCE
- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.
1. Participants:
    - a. Architect.
    - b. Contractor, including superintendent.
    - c. Installer, including project manager and supervisor.
    - d. If requested, Manufacturer's qualified technical representative.
    - e. Installers of other construction interfaced with Work.
  2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
    - a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
    - b. Review Contract Document requirements.

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- c. Review approved submittals.
- d. Review inspection and testing requirements.
- e. Review environmental conditions and procedures for coping with unfavorable conditions.
- f. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.

3. Record discussions, including decisions and agreements, and prepare report.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.10 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- B. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- C. Coordinate locations and dimensions of other work specified in other Sections that relates to hydraulic elevators, including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.11 WARRANTY

- A. Manufacturer's Warranty: Furnish manufacturer's written material and labor warranty signed by an authorized representative using manufacturer's standard form agreeing to furnish materials and labor required to repair or replace work which exhibits material defects caused by manufacture or design and installation of product. "Defects" is defined to include but not limited to deterioration or failure to perform as required.
  - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
  - 2. Warranty Period: Manufacturer shall warrant the products to be free from material and labor Defects for a period of 1 year from date of Substantial Completion.

1.12 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.

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1. Service Records: Installer shall provide a report of all service calls, maintenance service and repairs made during the initial maintenance service period.
  2. Perform maintenance, including emergency callback service, during normal working hours with two hour or less response time.
- B. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
- C. Parts: Contractor guarantees to sell parts, including circuit boards, to the Owner or Owner's Agent.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
1. KONE Inc.
  2. Otis Elevator Co.
  3. Schindler Elevator Corp.
  4. TK Elevator.
- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
1. Manufacturer and Product: TK Elevator; Endura MRL.

### 2.2 MATERIALS, GENERAL

- A. Source Limitations: Obtain elevators, including hydraulic passenger elevators when specified in another Section, from single manufacturer. Provide secondary components and car enclosures only as recommended by manufacturer of primary materials.
1. Major elevator components, including pump-and-tank units, plunger-cylinder assemblies, controllers, signal fixtures, door operators, car frames, cars, and entrances, are manufactured by single manufacturer.

### 2.3 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable provisions of ASME A17.1/CSA B44 "Safety Code for Elevators and Escalators".

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- B. Accessibility Requirements: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC A117.1 and requirements of authorities having jurisdiction.

2.4 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components are used, as included in standard elevator systems and as required for complete system.

- B. Elevator(s) Description:

1. Type:

- a. Holeless, beside-the-car, telescoping, cylinder.

2. Rated Load: 2100 lb.

3. Rated Speed: 100 fpm (0.51 m/s).

4. Operational and Supervisory Control System: Microprocessor based.

5. Auxiliary Operations:

- a. Battery-powered lowering.  
b. Automatic dispatching of loaded car.  
c. Nuisance call cancel.  
d. Key switch operation.

6. Single Car-Control Stations. Provide one car-control station in elevator.

7. Car Enclosures:

- a. As indicated on Drawings.  
b. Inside Width: Unless otherwise indicated, Manufacturer's standard for rated load; measured from side wall to side wall.  
c. Inside Depth: Unless otherwise indicated, Manufacturer's standard for rated load; measured from back wall to front wall (return panels).  
d. Inside Height: Unless otherwise indicated, 96 inches measured to underside of ceiling.

- 1) Doghouse: Provide raised section at rear of service car to maximum allowable height.

e. Front Walls (Return Panels) and Car Fixtures:

- 1) Satin stainless steel, No. 4 finish.

f. Side and Rear Wall Panels and Reveals:

- 1) Plastic laminate.

g. Door Faces (Interior):

- 1) Satin stainless steel, No. 4 finish.

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- h. Door Sills:
    - 1) Aluminum.
  - i. Ceiling:
    - 1) Satin stainless steel, No. 4 finish.
  - j. Handrails: Unless otherwise indicated, **1-1/2 inches (38 mm)**.
    - 1) Satin stainless steel, No. 4 finish.
  - k. Floor recessed and prepared to receive stone or ceramic tile (Refer to Division 9 Section Tiling).
  - l. Floor Thickness, Including Setting Materials: Verify thickness above subfloor; coordinate car door sill height with manufacturer.
8. Hoistway Entrances:
- a. Width: Unless otherwise indicated, **36 inches**.
  - b. Height: Unless otherwise indicated, **84 inches**.
  - c. Type:
    - 1) Single-speed side sliding.
  - d. Doors and Frames at First Floor:
    - 1) Primed or powder-coated steel.
  - e. Doors and Frames at Other Floors:
    - 1) Primed or powder-coated steel.
  - f. Sills at First Floor:
    - 1) Aluminum, mill finish.
  - g. Sills at Other Floors:
    - 1) Aluminum, mill finish.
9. Hall Fixtures:
- a. Satin stainless steel, No. 4 finish.
10. Additional Requirements:
- a. Provide inspection certificate in each car, mounted under acrylic cover with frame matching adjacent metal finish.
  - b. Provide hooks for protective pads in all cars and two complete set(s) of full-height protective pads.
  - c. **Elevator Manufacturer shall furnish a collapsible pit ladder.**

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2.5 SYSTEMS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard preengineered elevator systems and as required for a complete system.
- B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.
  - 1. Pump shall be submersible type with submersible squirrel-cage induction motor, and shall be suspended inside oil tank from vibration isolation mounts.
  - 2. Motor has variable-voltage, variable-frequency control.
- C. Oil Cooler: Suitable sized oil cooler units shall be installed on the oil storage tank. Cooler shall be sized to insure oil temperature does not cause "oil odors" in machine room or hoistway; or cause heat "shutdown" of the elevator. Power for oil cooling unit provided by elevator controller.
- D. Hydraulic Silencers: System has hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- E. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.
  - 1. Cylinder units are connected with dielectric couplings.
  - 2. Casing for Underground Piping: Schedule 40 PVC pipe complying with ASTM D1785, joined with PVC fittings complying with ASTM D2466 and solvent cement complying with ASTM D2564.
- F. Hydraulic Fluid:
  - 1. Hydraulic Fluid, Manufacturer's Standard: Elevator manufacturer's standard fire-resistant fluid with additives as needed to prevent oxidation of fluid, corrosion of cylinder and other components, and other adverse effects.
- G. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.
- H. Hoist Beams: Provide framing as indicated in Drawings to support elevator installation. Comply with Division 05 Section "Structural Steel Framing" for materials and fabrication.
- I. Car Frame and Platform: Welded steel units.
- J. Guides: Provide guides at top and bottom of car frame.

2.6 OPERATION SYSTEMS

- A. Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
  - 1. Firefighter's Service: Provide equipment and operation in accordance with Code requirements and Authorities Having Jurisdiction.

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B. Auxiliary Operations:

1. Single-Car Battery-Powered Automatic Evacuation:

- a. If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to a preselected floor, opens its doors, and shuts down. If car is below the preselected floor, it is lowered to the next lower floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
2. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors start closing.
  3. Nuisance Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.
  4. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after 5 minutes and are re-energized before car doors open.
  5. Special Emergency Control – Firefighter's Service: Provide Phase I and Phase II Firefighters' Service; comply with requirements of authorities having jurisdiction and applicable provisions of ASME A17.1/CSA B44 "Safety Code for Elevators and Escalators".
    - a. Firefighters Emergency Operation - Phase II: In-car key switch control of each elevator during the Emergency operation.

C. Security Features: Security features do not affect emergency firefighters' service.

1. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at car-control stations and hall push-button stations. Key is removable only in deactivated position.

D. Electrical Wiring:

1. Furnish and install complete insulated wiring to connect all parts of the equipment. Properly ground all components as required by National Electric Code.
2. Provide 15% spare wires between each controller, selector, hoistway junction box, and control panel; also provide 15% spare conductors in each trail cable; all spares shall be properly tagged or otherwise identified with clear and indelible markings.
3. Provide a total of twelve (12) shielded pairs for communication and security use in the traveling cables for each elevator. The shielded pairs shall be located in a cable which is not used to carry alternating current circuits. The shielded wiring shall extend to a junction box in the elevator controllers in machine room.

2.7 DOOR-REOPENING DEVICES

- A. Infrared Array: Provide door-reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams causes doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door-reopening device, a loud buzzer sounds and doors begin to close at reduced kinetic energy.

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2.8 CAR ENCLOSURES

- A. General: Provide enameled- or powder-coated-steel car enclosures to receive removable wall panels, with removable car roof, access doors, power door operators, and ventilation.
1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
1. Subfloor:
    - a. Stone or Ceramic Tiling: Exterior, C-C Plugged grade plywood, not less than **7/8-inch (22.2-mm)** nominal thickness.
  2. Floor Finish:
    - a. As scheduled or indicated in Design Selections; match samples accepted by Architect.
  3. Enameled- or Powder-Coated-Steel Wall Panels: Flush, formed-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel or powder-coat finish; colors as selected by Architect from manufacturer's full range.
  4. Stainless Steel Wall Panels: Flush, formed-metal construction; fabricated from stainless steel sheet.
  5. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to **1/2-inch (13-mm)** fire-retardant-treated particleboard or manufacturer's standard honeycomb core with plastic-laminate panel backing and manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E84. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
  6. Fabricate car with recesses and cutouts for signal equipment.
  7. Fabricate car door frame integrally with front wall of car.
  8. Primed or Powder-Coated-Steel Doors: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied, rust-resistant primer or powder coating for field painting.
  9. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet or by laminating stainless steel sheet to exposed faces and edges of enameled- or powder-coated-steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
  10. Sight Guards: Provide sight guards on car doors.
  11. Sills: Extruded or machined metal, with grooved surface, **1/4 inch (6.4 mm)** thick.
  12. Metal Ceiling: Flush panels, with LED downlights in the center of each panel. Align ceiling panel joints with joints between wall panels.
  13. Light Fixture Efficiency: Not less than 35 lumens/W.
  14. Ventilation Fan Efficiency: Not less than **3.0 cfm/W (1.4 L/s per W)**.
  15. Handrails: Manufacturer's standard handrails, of shape, metal, and finish indicated.
  16. Emergency Exits: Provide emergency exits sized and located in each car in accordance with the Elevator Code.

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2.9 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile accommodate hoistway wall construction.
  - 1. Where gypsum board wall construction is indicated, frames are self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door-and-frame assemblies comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Protection Rating: 1-1/2 hours.
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
  - 1. Frames: Not less than 14 gauge.
  - 2. Doors: Not less than 16 gauge.
  - 3. Primed or Powder-Coated-Steel Frames: Formed from cold- or hot-rolled steel sheet. Provide with factory-applied, rust-resistant primer or powder coating for field painting.
  - 4. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than **3 inches (76 mm)** high, on both jambs of hoistway door frames.
  - 5. Entrance Jamb Plates: Cast metal plates complying with Elevator Code and Accessibility requirements.
  - 6. Primed or Powder-Coated-Steel Doors and Transoms: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied, rust-resistant primer or powder-coating for field painting.
  - 7. Stainless Steel Doors and Transoms: Flush, hollow-metal construction; fabricated from stainless steel sheet or by laminating stainless steel sheet to exposed faces and edges of enameled- or powder-coated-steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
  - 8. Sight Guards: Provide sight guards on doors matching door edges.
  - 9. Sills: Extruded or machined metal, with grooved surface, **1/4 inch (6.4 mm)** thick.
  - 10. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

2.10 SIGNAL EQUIPMENT

- A. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal-resistant buttons and lighted elements illuminated with LEDs.
- B. Swing-Return Car-Control Stations: Provide car-control stations mounted on rear of hinged return panel adjacent to car door and with buttons, switches, controls, and indicator lights projecting through return panel but substantially flush with face of return panel.
  - 1. Unless indicated otherwise, include manufacturer's premium fixture selection and provide full width swing front return and car operating panels. Logos or manufacturer's name are not permitted on exposed surfaces.
  - 2. Mark buttons and switches for function. Use both tactile symbols and Braille.

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3. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
  4. Mount controls at heights complying with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
- C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
1. Provide emergency elevator communication systems for the deaf, hard of hearing and speech impaired when required Code or Authorities Having Jurisdiction.
- D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet or telephone jack in each car and required conductors in traveling cable for firefighters' two-way telephone communication service specified in Division 28 Fire-Alarm System.
- E. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- F. Hall Push-Button Stations: Provide one hall push-button station at each landing for each single elevator or group of elevators, but not less than two stations for each three elevators in a group.
1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
  2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.
  3. Provide Firefighters Emergency Service – Phase I key switch in designated hall station.
  4. If required by authorities having jurisdiction, provide telephone jack in each unit for firefighters' two-way telephone communication service.
- G. Hall Lanterns: Units with illuminated arrows; however, provide single arrow at terminal landings. Provide one of the following:
1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
- H. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
1. At manufacturer's option, audible signals may be placed on cars.
- I. Hall Position Indicators: Provide illuminated, digital-display-type position indicators, located above each hoistway entrance at ground floor.
1. Provide units with flat faceplate for mounting and with body of unit recessed in wall.
  2. Integrate ground-floor hall lanterns with hall position indicators.

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- J. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

## 2.11 FINISH MATERIALS

- A. General: Provide the following materials for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated.
  - 1. Car Shell: Not less than 14 gauge.
  - 2. Car Canopy: Not less than 12 gauge.
- B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
- C. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.
- D. Stainless Steel Sheet: ASTM A240/A240M, Type 304.
- E. Stainless Steel Bars: ASTM A276/A276M, Type 304.
- F. Stainless Steel Tubing: ASTM A554, Grade MT 304.
- G. Aluminum Extrusions: **ASTM B221** (ASTM B221M), Alloy 6063.
- H. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS for flat applications, Type HGP for post-formed applications and Type BKV for panel backing.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates and areas to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.
- B. Examine hoistways, hoistway openings, pits, and machine rooms as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

### 3.2 INSTALLATION

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

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1. Respective manufacturer's written installation instructions.
  2. Accepted submittals.
  3. Contract Documents.
- B. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor and braced at intervals as needed to maintain alignment. Anchor cylinder guides at spacing needed to maintain alignment and avoid overstressing guides.
- C. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.
- D. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- E. Install piping above the floor, where possible. Install underground piping in casing.
- F. Lubricate operating parts of systems as recommended by manufacturers.
- G. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- H. Leveling Tolerance: **1/4 inch (6 mm)**, up or down, regardless of load and travel direction.
- I. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- J. Locate hall signal equipment for elevators as follows unless otherwise indicated:
1. For groups of elevators, locate hall push-button stations between two elevators at center of group or at location most convenient for approaching passengers.
  2. Place hall lanterns either above or beside each hoistway entrance.
  3. Mount hall lanterns at a minimum of **72 inches (1829 mm)** above finished floor.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer/Fabricator's Field Service: Manufacturer/fabricator's qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer/fabricator's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.
1. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.

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- B. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- C. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 PROTECTION

- A. Temporary Use: Temporary use of elevators for construction purposes is not allowed unless authorized by Owner. Comply with the following requirements for each elevator used for construction purposes:
  - 1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
  - 2. Provide strippable protective film on entrance and car doors and frames.
  - 3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
  - 4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
  - 5. Do not load elevators beyond their rated weight capacity.
  - 6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
  - 7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.
    - a. Restore elevator sill(s) to new condition or replace with new sill(s).

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).
  - 1. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
- B. Check operation of each elevator with Owner's personnel present before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

END OF SECTION

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**SECTION 23 3000**

**HVAC AIR DISTRIBUTION**

**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.
- B. Refer to SECTION 21 0000 – MECHANICAL SPECIAL PROVISIONS.

**1.02 SCOPE**

This section of the specifications includes all labor and materials required for the complete and finished installation of the following:

- A. Ductwork
- B. Air distribution devices
- C. Fans
- D. Flexible connections

**1.03 RELATED WORK SPECIFIED ELSEWHERE**

- A. Unitary HVAC units
- B. Air filters
- C. Insulation
- D. Vibration isolation
- E. Access doors
- F. Piping

**1.04 SUBMITTALS**

Submit manufacturer's certified rating data, descriptive literature and catalogue cuts for all proposed:

- A. Fans
- B. Air distribution devices
- C. Fire dampers and fire/smoke dampers
- D. Flexible ductwork
- E. Duct construction details
- F. Shop drawings of duct layout

**PART 2 - PRODUCTS**

**2.01 DUCTWORK, METALLIC**

- A. All ductwork, except as otherwise specifically noted, shall be constructed of galvanized steel sheets. Ductwork shall also be mil-bonderized (paint grip) where exposed to view.

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- B. Where square elbows are indicated on the plans, or are otherwise necessary, turning vanes equal to "Tuttle & Bailey" Ducturns shall be installed. Shop-built double-vane turning vanes, constructed to SMACNA duct manual standards will be acceptable. Rounded elbows indicated shall have a minimum turning radius of 1-1/2 times the width of the duct in the plane of the bend.
- C. At each split-tee, at each branch from a high or low-pressure main duct, and at each sweeping takeoff to an air outlet, there shall be provided a splitter or take-off damper with an adjusting device. At all other takeoff boots to air outlets of any type, as well as all exhaust takeoffs and branches, there shall be provided an approved dampering device for effecting volume control. Volume damper with adjustable device shall also be provided at main return air duct at each air handling unit, A/C unit and heat pump unit, located upstream of outside air connection. Similar additional dampering devices shall be provided at specific locations as directed by the Test & Balance Contractor and/or as otherwise required for proper balancing of air systems, whether or not shown on the drawings.
- D. Splitter and volume dampers shall be shop-constructed of same materials as ductwork. Damper rods shall be square steel rods with "U" bolts, "Young" Type CRS No. 660, or equal. End bearings shall be equal to "Young" No. 654, 5, 6, 9, or equal.
- E. All duct dampers in concealed areas or above inaccessible ceilings shall be provided with damper regulators including "Young" No. 301 locking nut regulator with concealed C.P. cover, "Young" No. S-900 threaded steel cable rod, "Young" No. 912 or 914 operators; as required for complete assemblies.
- F. All forced air inlets to, or outlets from the building shall be provided with 18 gauge galvanized steel wire screens, in suitable removable frames of same material as the outlet or inlet, except as otherwise noted.
- G. All duct sizes indicated on the drawings represent inside free-air dimensions. All ductwork shown as double-wall construction, shall have outer sheetmetal dimensions increased accordingly to allow for interior insulation thicknesses.
- H. All round main ducts shall be constructed as to withstand up to 10.0" W.G. static pressure. Round branch ducts to air devices may be of snap-lock construction rated not less than 2" W.G. static pressure.
- I. All rectangular and round low pressure and high-pressure ductwork shall be constructed to SMACNA Duct Manual Standards for Low Velocity and High Velocity ducts, as appropriate. All ductwork shall be minimum 24 gauge and as required by U.L. Design 246 or 509.

## **2.02 DUCTWORK; FLEXIBLE**

- A. Flexible ductwork shall be limited to low pressure supply air systems only, from supply ducts to ceiling diffuser or air terminal, and shall be "Thermaflex" Type M-KC, or equal, coated reinforced glass fabric or aluminum laminate liner bonded over corrosion-resistant heavy gauge steel wire helix, and with a factory-applied 3/4 pound density glass fiber insulation having an exterior reinforced metalized vapor barrier jacket. Duct insulation shall be 1.5"-2" thick to meet R-value ratings as specified under SECTION 23 0700 – HVAC INSULATION. Flexible ductwork shall be U.L. labeled, and rated to withstand not less than 6" of water gauge pressure without leakage, and not less than 5500 fpm of internal air velocities without deterioration. Flexible ductwork shall be

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constructed in conformance with NFPA standards, Bulletin 90A, for a flame spread rating of not more than 25 and a smoke developed rating of not more than 50.

- B. Manufacturer's rated R-value shall be identified on all flexible duct at intervals no greater than 10'-0" in accordance with the International Energy Conservation Code.

**2.03 AIR DISTRIBUTION DEVICES**

- A. Air distribution devices shall be fabricated of steel or aluminum, and shall be standard factory-manufactured products, constructed and rated in accordance with the recommendations of the Air Diffusion Council.

- B. All air distribution devices shall include integral neck flanges for duct connections. Neck sizes shall be as shown on the drawings.

- 1. For ceiling return and exhaust grilles to be installed in lay-in ceiling grids, sizes shown on the drawings represent overall grille size including perimeter frame, so as to fit the dimensions of the tee-grid. Perimeter frames shall be thin-frame style to maximize grille core, and shall include full perimeter neck flange for duct connections. Air device manufacturer shall coordinate with Sheetmetal Contractor for proper size of connecting ducts.

- C. Blade spacing, horizontal and/or vertical, in all supply, return or exhaust grilles and registers shall not exceed .67".

- D. Except where otherwise noted, all wall and ceiling units shall have baked enamel (satin anodized for exposed aluminum) finish; color as selected by the Architect.

- E. Air devices specified represent the minimum standard of quality required for this project. Equivalent styles and types of air devices furnished by the following manufacturers will be acceptable:

- 1. Krueger
- 2. Titus
- 3. Tuttle & Bailey
- 4. Nailor
- 5. Metal-Aire
- 6. Price

- F. Grilles, registers, and outlets shall conform to the following:

<u>MARK</u>	<u>DEVICE</u>
"A"	Square ceiling diffuser, four-way blow, equalizing deflector, with integral face-plate arranged for installation in a 24" x 24" lay-in ceiling grid; "Krueger" Series 1400, or equal.
"B"	Ceiling return or exhaust grille with ½" x ½" x 1" thick aluminum grid core, minimum width frame, loose-key opposed blade volume damper (exhaust grilles only), arranged for installation in a 24" x 24" lay-in ceiling grid; "Krueger" Series EGC-15, or equal.
"C"	Same as "A", except with faceplate arranged for installation in a gypsum board ceiling.

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- "D" Same as "B", except with frame arranged for installation in a gypsum board ceiling.
- "E" Ceiling or sidewall supply register, steel construction, with removable core, loose-key opposed blade volume damper, horizontal front blades, 1/2" spacing, and double deflection arranged for installation in a gypsum board ceiling, 24" x 24" lay-in ceiling grid, or wall; "Krueger" Series 4880, or equal.

## 2.04 FANS

- A. Fans specified in the following paragraphs represent the minimum standard of quality required for this project. Equivalent styles and types of fans furnished by the following manufacturers will be acceptable:
1. Cook
  2. Greenheck
  3. Twin City
  4. Penn
- B. Roof-mounted exhaust fans shall, except as otherwise noted, be low-silhouette type with spun-aluminum weatherproof housings, backwardly inclined welded or riveted aluminum wheel centrifugal blowers, self-acting anti-backdraft dampers, aluminum bird screens, pre-wired disconnect switches, resiliently mounted motors, drives, ventilated motor compartments, etc., as required for complete units. Fans shall be direct drive units where available as scheduled on the drawings, otherwise belt drive. Direct drive fans shall include variable speed fan control for air flow adjustment. Belt-driven fans (except as otherwise noted) shall have the driving motor mounted at one side with the shaft vertically upward to minimize height of unit. Fans shall be "Cook" Model ACE, or equal.
- C. Each roof-mounted fan shall be provided with a factory-fabricated roof mounting curb which shall mate with its fan to provide support and complete weathertight installation when installed. Each curb shall be 18" high minimum full-perimeter type, all-welded construction of 16 gauge minimum zinc-coated steel, properly braced and reinforced to support each fan. Each curb shall include treated 1" x 4" wood nailer strip, top flange with outer lip, and strip-top gasketing as required to provide proper continuous seal. Curbs shall be internally insulated in an approved manner.
1. Installation of each roof-mounted fan unit and roof curb shall be in accordance with wind load requirements prescribed in the International Building Code. Each curb shall be constructed and rated to meet design wind speed ( $V_{ult}$ ) of 120 MPH, under building Exposure Category C of the IBC, and in accordance with other criteria defined in the Structural Drawings. Each curb shall include wind restraint brackets to secure each fan unit to its curb, as well as base flange anchored to roof structure. Refer to Structural Drawings for structure and angle framing being provide for each unit on the roof.
  2. Roof curbs for kitchen hood exhaust fans shall be U.L. Listed extended ventilated curbs as required for grease hood exhaust application.
  3. Contractor and unit manufacturer shall refer to Architectural Specifications and Details for additional roof curb requirements. Each curb shall be arranged to accommodate external insulation and flashing around the perimeter as detailed.

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4. Contractor shall provide wood blocking and shimming at the base of each curb, as required to maintain minimum flashing heights and insure level installation of each fan unit.
- D. Where indicated or otherwise required for sloped roofs, fan bases shall be sloped with mounting flanges and flashing angled and arranged for installation on a sloped metal standing seam or composition shingle roof (see Architectural). Base curbs shall be constructed for a sloped metal or composition shingle roof, and shall be of 18 gauge minimum galvanized steel fully welded construction, with 1-1/2" acoustical lining material, neoprene or sponge rubber flashing strip top gasket, water diverters, and self-flashing mounting flange fabricated to accommodate the contour of the roof. Curbs shall match slope of roof so as to support fans at a level position. Curbs shall be "Mallory Metal Products" Series MMP, or equal.
1. Installation of each roof-mounted fan unit and roof curb shall be in accordance with wind load requirements prescribed in the International Building Code. Each curb shall be constructed and rated to meet design wind speed ( $V_{ult}$ ) of 120 MPH, under building Exposure Category C of the IBC, and in accordance with other criteria defined in the Structural Drawings. Each curb shall include wind restraint brackets to secure each fan unit to its curb, as well as base flange anchored to roof structure. Refer to Structural Drawings for structure and angle framing being provide for each unit on the roof.
  2. Contractor shall review existing buildings and verify all locations, pitch and type of sloped roof arrangements for proper curb selections.
- E. Where scheduled and indicated on the drawings, fans shall also include remote wall-mounted thermostats to cycle respective fans to maintain space temperature setpoint (adjustable).
- F. Except as otherwise noted, fan motors shall be ball-bearing type, permanently lubricated, open frame, 1750 RPM, equipped with thermal overload protection.
- G. Fan capacities shall be as indicated on the plans.
- H. Propeller recirculation fans shall each be a fabricated unit, with case aluminum air foil propeller fan bolted to central aluminum hub with safety retainers, cylinder housing with helical gear reducer, permanently lubricated drive with lip seals, resiliently-mounted motor, steel mounting frame and post, disconnect switch, roof mounting bracket, and baked enamel finish; "Big Ass Fan" PowerFoil Series. Each fan shall include factory U.L. Listed unit-mounted variable frequency drive (VFD), and remote wall-mounted variable-speed control switch for fully variable airflow control.

## **2.05 FIRE DAMPERS AND FIRE/SMOKE DAMPERS**

- A. Fire dampers shall be single-blade or multiple-interlocked blade type to suit the conditions. All fire dampers shall be constructed to standard of NFPA Pamphlet #90A and supplements for not less than 1-1/2 hours protection, except as otherwise noted, shall be U.L. labeled, and each shall be fitted with a 160° fusible link. Stainless steel negator springs and blade locks shall be utilized in horizontal installations. Fire dampers shall be equal to "Air Balance" Model 119A for openings without ductwork attachment and Model 119B with extended damper head for dampers in low velocity dampers which shall have not less than 95% free open area.
- B. Combination fire/smoke dampers shall be "Ruskin" Model FD-35, or equal, 1-1/2 hour U.L. and NFPA approved damper assembly having multiple interlocking rated damper blades, 165°F fusible link for fire closure, spring return damper rod and motorized actuator operated by smoke detector for smoke closure, negator springs for horizontal installation, etc., for a complete assembly. Each

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damper shall be constructed to allow for required testing of smoke damper operation without compromising fusible link integrity. Upon detection of products-of-combustion, smoke detector shall close damper and energize fire alarm system. Free area shall be 95% of attaching ductwork. Operator voltage shall be 120 volt or 24 volt as compatible with fire alarm system.

### **PART 3 - INSTALLATION**

#### **3.01 DUCTWORK**

- A. The Contractor shall furnish and erect all supply, return, outside and exhaust air ventilating ducts, risers, branches, elbows, dampers, etc., necessary to make the complete systems, in accordance with the recommendations of the latest ASHRAE Guide and SMACNA Low Velocity or High Velocity manuals as appropriate, as to gauges, transverse joint connections, bracing, and as indicated on the drawings.
- B. All horizontal ducts shall be supported by means of 16 gauge cold-rolled steel channels and No. 12 SWG galvanized steel wire, or by means of solid galvanized steel strap hangers per SMACNA Standards, spaced not more than 6'-0" on centers, and securely fastened into the construction above as required by U.L. Design 246 or 509. All vertical ducts shall be supported with angles riveted to the duct fastened to wall or partitions on not over 6'-0" on centers. All ductwork shall be left clean inside.
- C. All rectangular duct panels 12" or larger, not internally lined or externally insulated, shall be cross-broken or beaded.
- D. For all ducted systems, sheetmetal branch ducts shall be extended to all air devices (registers, grilles, etc.), and shall be properly connected to neck flange of each air device and sealed airtight with duct mastic. Flexible ductwork shall be limited to air terminal units and ceiling-mounted supply diffusers only, as shown on the drawings and specified herein. Connecting duct sizes shall match the neck size of all associated air devices.
  - 1. Contractor shall provide minor offsets and transitions required to align with exact grille locations.
  - 2. Sheetmetal Contractor shall coordinate exact neck sizes and connection arrangements with air device manufacturer.
- E. Ducts shall be installed to leave sufficient head room in all cases, and where it becomes necessary to change the size or shape of a duct to conform to structural or architectural conditions, the Architect must be consulted for resizing or rerouting.
- F. Where ducts pierce roof to terminate in cowls, fans, ventilators, etc., adequate flashing and counterflashing shall be provided to exclude any rainwater from entering the building through duct roof penetrations.
  - 1. All duct penetrations through building envelope not otherwise protected shall be caulked, gasketed and sealed as required for weathertight installation.
- G. All adjustable volume dampers shall be flagged with brightly colored ribbon or tape in accordance with local code authorities.

- H. Provide duct access panels at all fire damper and fire/smoke damper locations as required to provide access for internal damper components. Panel shall be insulated, gasketed, with latching devices as required. Access panels shall be identified with permanently affixed labels having letters not less than ½" in height reading: "FIRE DAMPER".
- I. An approved mastic duct joint sealant shall be applied at all duct joints and seams in accordance with UL 181. Sealant application shall be of sufficient thickness and coverage to prevent air leaks. Duct tape is strictly prohibited.

### **3.02 DUCTWORK; FLEXIBLE**

- A. Flexible ductwork shall be installed in accordance with manufacturer's recommendations, and shall be limited to supply connections to ceiling diffusers only. High velocity, high pressure system ductwork shall connect to the main supply ducts with a conical tee and a short duct collar. Low velocity, low pressure systems shall be provided with a spin-in type duct collar with an adjustable air scoop and adjustable damper. Minimum length of flexible ductwork shall be 18". Maximum length shall be as shown on the plans, but in no case shall length exceed 6'-0".
- B. Flexible ducts shall be installed and supported to allow smooth radius turns to air devices, with no sags, folds or crimps. Contractor shall provide strap support and saddle near each air device to provide smooth unencumbered sweep from branch duct to air device connection.

### **3.03 AIR DISTRIBUTION DEVICES**

- A. Each supply, return, exhaust, or other duct terminal shall be provided with a grille, register, or outlet as noted on the plans and specified herein. For selection of acceptable diffuser sizes where the standard neck size is other than the specific values indicated on the plans, the following rules shall apply:
  - 1. For rectangular neck diffusers: next larger available dimension
  - 2. For round neck diffusers: a diameter sufficient to handle the specified air quantities at a maximum neck velocity of 500 fpm.
- B. Locations of all air devices shall generally follow those arrangements indicated on the drawings, but shall also be installed in coordination with all other ceiling components including light fixtures, speakers, sprinkler heads, etc., as required to provide symmetrical patterns in each space.
- C. Mounting frames for grilles and registers shall be installed in time to be painted out with the building surfaces by the General Contractor. All other air distribution devices, including grille cores, shall not be installed until building painting is complete.
- D. Interior ductwork visible in back of diffusers, registers, and grilles shall be painted flat black.

### **3.04 FLEXIBLE CONNECTIONS**

- A. Furnish and install between each fan unit and connecting ductwork a flexible connection.
- B. Flexible connections shall consist of a clean 2" break between metal ducts, jointed by a waterproof and fire-resistant canvas fabric, weighing not less than 20 ounces per square yard. Fabric shall be fastened to ductwork with 1" x 1/8" band iron and sheet metal screws.

**3.05 FIRE DAMPERS AND FIRE/SMOKE DAMPERS**

- A. Fire dampers, fire/smoke dampers, and ceiling radiation dampers shall be provided at all duct and air device penetrations through fire-rated construction, including walls, ceilings, floors, and roof, as indicated on the drawings and otherwise required by applicable construction codes. The Contractor shall carefully review fire-rated drawings and notations in the Architectural Drawings and shall provide all dampers required whether specifically indicated or not.

**3.06 EQUIPMENT**

- A. All types of equipment shall be installed as indicated on the plans, and in strict conformance with the manufacturer's instructions.
- B. Roof-mounted fans shall be installed on bases in such a manner as to facilitate convenient access to the self-acting louvers, where provided.

**3.01 ROOF CURBS FOR ROOF-MOUNTED FANS**

- A. Installation of roof-mounted fans and roof curbs shall be in accordance with wind load requirements under the International Building Code, rated for 120 MPH wind speed, building Exposure Category C; and as detailed and noted on the Structural Drawings. Each curb shall be anchored to roof structure per Structural Drawings, and equipment shall be secured to curb with wind restraint brackets.
- B. Unit and curb installation shall also be in accordance with Manufacturer's instructions, and shall be installed in such a manner as to facilitate convenient access to self-acting backdraft or control dampers, where provided.
- C. Contractor shall provide wood blocking and shimming at the base of each curb, as required to maintain minimum flashing heights and insure level installation of each fan unit.
- D. Contractor shall refer to Architectural Specifications and Details for additional roof curb requirements. Each curb shall be arranged to accommodate external insulation and flashing around the perimeter as detailed.

**3.07 VIBRATION AND NOISE CONTROL**

- A. Transmission of perceptible vibration, structure-borne noise or objectionable air borne noise by and/or from equipment installed to occupied areas will not be permitted. The Contractor shall submit for approval data showing disturbing frequency, support weight, static deflection or natural frequency and efficiency for each isolator and damper he proposes to use.
- B. All isolation material selections are to be based on laboratory published or factory certified data, proving that all such materials and usage comply with these specifications. Should any noise or vibration be objectionable to the Engineer, field instrumentation tests and measurements shall be made by the Contractor to determine the source, cause, and path of such disturbance. The Contractor shall correct any variance or non-compliance with the specification requirements in an approved manner at no additional cost to the Owner.

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- C. All A/C units and fans shall be isolated from the building structure. In all cases, care must be taken to insure that all connections to the unit be sufficiently resilient to allow full undamped functioning of the unit isolators. This includes electrical raceway, ducts, drain, piping, etc.

**3.08 TESTING & BALANCING**

- A. Testing and balancing shall be performed by the selected TAB Contractor in accordance with the Testing & Balancing Specifications, as a separate subcontract. The Mechanical Contractor shall coordinate and support all TAB services as specified. Should the TAB Contractor determine any degree of unsatisfactory installation or operating condition of a related nature, this Contractor shall provide such additional correctional work as may be necessary to properly resolve the reported difficulties, without additional compensation (see Section 23 9900).
- B. In event of disagreement as to the necessity and/or scope of such correctional effort, or as to the satisfactory completeness thereof, the decision of the Owner and Engineer shall be final.

**END OF SECTION**

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**SECTION 23 8000**

**UNITARY HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT**

**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.
- B. Refer to SECTION 21 0000 – MECHANICAL SPECIAL PROVISIONS.

**1.02 SCOPE**

- A. This section of the specifications includes all labor and materials required for the finished and complete installation of the various heating, ventilating and air conditioning equipment, facilities and systems.
- B. Involved in the classification of heating, ventilating and air conditioning work above are the following systems:
  - 1. Unitary air conditioning and gas heating
  - 2. Miscellaneous, as indicated on the plans

**1.03 RELATED WORK SPECIFIED ELSEWHERE**

- A. Piping
- B. Valves, strainers and unions
- C. Insulation
- D. Material storage and handling
- E. Air distribution
- F. Fans
- G. Motor starters

**1.04 SUBMITTALS**

Submit manufacturers certified rating data, descriptive literature, and catalogue cuts for all proposed equipment items as follows:

- A. Package rooftop A/C units
- B. Air filters
- C. Vibration isolation

## PART 2 - PRODUCTS

### 2.01 PACKAGE ROOFTOP A/C UNITS

- A. Each unit shall be draw-through, single zone, down-discharge type as indicated. Unit shall be factory-assembled, piped, internally wired, fully charged and designed to operate at outdoor ambient temperatures as high as 120°F. Refrigerant shall be R-410a. Units which are eleven (11) tons or less shall comply with ARI Standard 210 and units which exceed eleven (11) tons shall comply with ARI Standard 360, or acceptable equivalent. Unit shall be listed by Underwriters' Laboratories, Inc. (or an acceptable equivalent), and all wiring shall comply with National Electrical Code. Unit shall be designed for outdoor rooftop installation, and exterior surfaces shall be phosphatized, zinc-coated steel with epoxy resin primer and baked enamel finish or approved equal.
- B. Units shall be arranged for bottom duct connections inside the roof curbs. Side duct connections shall be provided only where noted on the drawings.
- C. Unit shall have serviceable hermetic or welded shell hermetic, 3600 rpm, heavy-duty type compressor(s) with internal spring vibration isolation and crankcase heaters. Each refrigerant circuit shall include thermostatic expansion valve control (or approved equivalent) for each evaporator coil, service port valves, refrigerant head pressure control, and low ambient control for operation down to 15°F outside ambient temperature. Refrigerant circuit to each compressor shall include service isolation valves, where available.
- D. Contactors with 24-volt control circuit shall be provided for condenser fan, evaporator fan and compressor. Safety devices shall include high and low pressure switches, adjustable time delay on compressor cycling, winding thermostat, and manual reset compressor overloads. Each unit shall also include phase protection and low-voltage protection.
- E. Refrigerant coils shall be of copper tube and aluminum finned construction, with not less than 7 fins to the inch of tubes. Evaporator coils shall have no more than 15 fins to the inch and shall be factory pressure and leak tested at not less than 200 psig. Condenser coils within units, regardless of tonnage, shall have no more than 20 fins to the inch. Condenser coils shall be factory pressure and leak tested at not less than 420 psig, and shall be protected by coil guards against hail damage.
- F. All units at 3 tons and greater shall be multi-stage and variable air flow A/C units as indicated on the drawings, arranged for dehumidification capabilities and control operation as follows:
  - 1. Units shall each include a minimum two-stage compressor arrangement with two-stage temperature control and 2-speed variable fan speed control for reduced supply air at low-cool, in order to maintain humidity levels during lighter load conditions.
- G. Units at 7.5 tons and greater shall each include two or more compressors and refrigerant circuits with two-stage temperature control at minimum.
- H. Unit supply fans shall be belt driven, forward curved, centrifugal type with adjustable motor sheaves, or fixed drive with extra sheaves for proper fan speed adjustment. Where approved, units 5 tons and smaller may be direct drive with variable or multi-speed motors, subject to proper speed control adjustment as required to meet actual design flow rates, including replacement of motors, drives, sheaves, etc., if required, at no additional expense to the Owner. Thermal overload

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protection shall be provided for motors. Fan and motor bearings shall be permanently lubricated. Motor-fan assembly shall be completely isolated from unit with rubber mounts.

1. For all units 3 tons and greater, fans shall include multi-stage air flow control via factory ECM or VFD, or fully variable air flow via factory VFD, as specified.
- I. Condenser fans shall be direct drive, statically and dynamically balanced, with motors U.L. listed for outdoor use. Built-in thermal overload protection shall be provided for each motor. Motor bearings shall be permanently lubricated.
  - J. Casings shall be fully braced, and so arranged that all internal parts are fully accessible through side access panels. Access panels shall be hinged with latching devices (or equivalent). Unit casings shall be galvanized steel construction with internal insulation. Insulation shall be internal, glass fiber with reinforced foil-faced vapor barrier, or equal, not less than 1/2" thick, 1 pound density, and having a "K" factor of not higher than .25.
  - K. Drain pan insulation shall be similar to casing insulation in thickness and "K" value, and shall be protected by a complete sheet stainless steel inner pan to which the drain connections attach. Inner steel pan liner shall be stainless steel. Drain pan insulation may be omitted if the pan is arranged so that condensate within the pan cannot produce condensation on the outside of the unit casing.
    1. Unit drain pan shall include overflow float-switch or electronic monitoring switch that shall disable unit upon detection of high water level in pan, to prevent overflow.
  - L. All units shall include a watertight outside air hood with motorized control damper capable of admitting up to 35% outside air and installed with bird screen protection. Damper assembly shall be "low-leak" type of galvanized steel construction with gasketed edges, and with blades, linkages, shafts, bearings, etc., for complete assemblies.
    1. Outside air damper shall open to minimum design outside air flow rates scheduled on the drawings whenever unit fan is energized, and shall close whenever unit fan is de-energized. Damper shall be compatible for external control to keep damper closed during unoccupied setback operation.
    2. Designated units shall be provided with an economizer cycle assembly as scheduled on the drawings, with 0-100% fully-modulating outside air control dampers, return air control dampers, and barometric relief air dampers, to provide "free-cooling" based on enthalpy control as specified under paragraph 2.03 of this section. Assembly shall include preset minimum O.A. position, and air hoods with insect screens.
  - M. Each unit shall include a filter holding frame for 2" filters as specified under AIR FILTERS. Filter section shall include hinged access doors with latching devices.
  - N. Units shall include electric heating section of capacities indicated on the equipment schedule. Each heater assembly shall be UL Listed and shall include overload protection circuit breakers, automatic reset limit switches and heat limiters for primary and secondary overcurrent and thermal protection, and airflow proving switch. Heater elements shall be open wire type of nickel-chromium, adequately supported and insulated with ceramic bushings. All heater elements shall be warranted by the manufacturer for a minimum of 5 years. (The warranty shall be non-prorated.)

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- O. Unit components shall include minimum non-prorated replacement warranties as follows:
1. All Parts: Five (5) Years
- P. Unit shall be rated for premium SEER and EER efficiency in accordance with ARI Conditions, as available. Ratings shall exceed minimum requirements scheduled on the drawings and set forth under the International Energy Conservation Code, latest edition.
- Q. Each unit shall be provided with a factory-fabricated roof mounting curb which shall mate with its rooftop unit to provide support and complete weathertight installation when installed. Each curb shall be 18" high minimum full-perimeter type, all-welded construction of 16 gauge minimum zinc-coated steel, properly braced and reinforced to support each unit. Each curb shall include treated 1" x 4" wood nailer strip, top flange with outer lip, and strip-top gasketing for supply/return ductwork and for unit perimeter as required to provide proper continuous seal. Curbs shall be internally insulated in an approved manner.
1. Installation of each A/C unit and roof curb shall be in accordance with wind load requirements prescribed in the International Building Code. Each curb shall be constructed and rated to meet design wind speed ( $V_{ult}$ ) of 120 MPH, under building Exposure Category C of the IBC, and in accordance with other criteria defined in the Structural Drawings. Each curb shall include wind restraint brackets to secure each A/C unit to its curb, as well as base flange anchored to roof structure. Refer to Structural Drawings for structure and angle framing being provide for each unit on the roof.
  2. Contractor and unit manufacturer shall refer to Architectural Specifications and Details for additional roof curb requirements. Each curb shall be arranged to accommodate external insulation and flashing around the perimeter as detailed.
  3. Contractor shall provide wood blocking and shimming at the base of each curb, as required to maintain minimum flashing heights and insure level installation of each A/C unit.
- R. Each of these assemblies shall include factory electronic microprocessor controllers, sensors, relays, etc., for complete functioning control. System shall be furnished by its manufacturer and/or have installed by the Mechanical Contractor:
1. 24 VAC control transformer, with factory wiring to all equipment-mounted control devices and to a numbered terminal strip. Terminal strip and unit wiring thereto shall be suitable for interface with safety shut-offs such as smoke detectors, and with external thermostat control.
  2. Terminal strip connection points and associated unit wiring to accomplish the following results in response to remote thermostat control:
    - a. Fan control, start/stop
    - b. Cooling stage 1 control, start/stop
    - c. Cooling stage 2 control, start/stop (if there is a stage 2)
    - d. Heating stage 1 control, start/stop
    - e. Heating stage 2 control, start/stop (if there is a stage 2)
    - f. Economizer control
    - g. Outside air damper shut-off control during night setback

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- S. Each A/C unit shall include U.L. listed Short Circuit Current Rating (SCCR) in accordance with NEC. Minimum SCCR rating for each unit shall be not less than 5kA at rated voltage.
- T. Each A/C unit shall include stamped nameplate identification affixed to the exterior cabinet. Nameplate data shall include Manufacturer, Model No., Serial No., Unit volts, phase, MCA & MOCP, electric data for each component, gas heating input & pressure, and unit Short Circuit Current Rating (SCCR) in accordance with NEC.
  - 1. SCCR identification will not be required for any unit under 60 amp FLA.
- U. Unit capacities shall be not less than those scheduled on the drawings. Units shall be as manufactured by the following:
  - 1. "Aeon" Series RQ/RN
  - 2. "Lennox" Series LGT
  - 3. "Trane" Series:
    - a. YCC below 3-ton
    - b. Precedent YHC-17 SEER 2-stage 3-5 ton
    - c. Precedent YHC 2-stage 7.5-10 ton
    - d. Voyager above 10 ton

## **2.02 EQUIPMENT EFFICIENCIES**

- A. All HVAC equipment shall meet or exceed the minimum rated equipment efficiencies scheduled on the drawings and as prescribed under the International Energy Conservation Code.

## **2.03 OPERATING & SAFETY CONTROL FOR UNITARY EQUIPMENT**

- A. Each A/C unit shall be provided with a room electronic programmable thermostat to control each unit for heating and cooling, complete with setpoint adjustment, HEAT-COOL-AUTO changeover, FAN ON-AUTO, user-defined programmed operating schedules, and digital display. Thermostats shall properly control the cooling stages, fan stages and heating stages of the units they control based on the manufacturer's particular method of two-stage (minimum) operation.
  - 1. Thermostat cooling control of each A/C unit 3-tons and greater shall be two-stage minimum with variable air flow control. Thermostat shall stage two-stage compressors, as well as Lo/Hi fan speed control, in accordance with unit manufacturer's requirements, as follows:
    - a. First Stage Cooling – Stage first-stage compressor, activate low fan speed, and open outside air damper to minimum scheduled position.
    - b. Second Stage Cooling – Stage maximum cooling compressor and activate high fan speed control. (See Section 23 8000 for A/C Unit Specifications.)
    - c. Large units with more than two stages of cooling shall be controlled for multiple fan speeds in association with each cooling stage.
    - d. Two-stage heating control shall similarly stage fan speed, with first-stage heating controlled through unit ignition control system for purge and preheat operation.

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2. Unit outside air damper shall open to minimum scheduled ventilation position when unit fan is energized, and shall close when de-energized.
  3. Separate setpoints for heating and cooling shall be provided, with adjustable deadband range of up to 5°F.
  4. Thermostat shall include fan control mode for cycling with heating/cooling or continuous operation.
  5. Thermostat shall include automatic setback or shutdown control during scheduled unoccupied periods. Adjustable setback temperatures shall have minimum ranges down to 50°F for heating and up to 90°F for cooling. Outside air dampers shall remain closed during night setback, unless economizer control is engaged.
  6. Any local manual override shall include adjustable time limit up to two (2) hours and retainage of established operating parameters.
  7. Where directed, each thermostat shall also include a heavy-duty metal protective guard with cylinder key lock, mounted with vandalproof screws and finished in color as selected by the Architect. This would apply to gymnasiums, activity rooms, cafeterias, auditoriums, and public spaces such as corridors.
- B. A/C Unit Ventilation Control: Unit outside air control dampers shall open to minimum scheduled ventilation position when unit fan is energized, and shall close when de-energized. Operation of outside air damper shall be based on proven status of unit fan (i.e., damper shall remain closed until fan current sensor indicates fan is running).
1. A/C Units Indicated with Economizer Assemblies: Outside air temperature and humidity sensors shall, through A/C factory economizer controller, operate economizer control for free-cooling whenever the outside air enthalpy is below setpoint enthalpy (65°F, 60% RH; adjustable). Economizer control shall be deactivated whenever the outside air enthalpy is above enthalpy setpoint.
    - a. Supply air temperature sensor shall, through economizer controller, modulate the outside air and return air to maintain supply air temperature setpoint (55°F; adjustable).
    - b. Upon a further call for cooling, room thermostat shall control first-stage compressor to maintain room temperature setpoint.
    - c. Economizer control shall be locked-out whenever unit is under heating mode operation.
- C. Temperature-Controlled Exhaust Fans: Where indicated on the drawings, room programmable thermostat shall cycle exhaust fan to maintain cooling temperature setpoint (75°F; adjustable).
- D. All control wiring and associated conduit shall be furnished and installed by Mechanical Contractor, to provide complete control and operation of HVAC systems as indicated and specified, and in accordance with manufacturer's instructions. All control wiring shall be installed in conduit where concealed in walls or chases, or exposed. Wiring above ceilings will not require conduit but shall be plenum-rated cabling properly supported to structure.

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- E. Each A/C unit shall be provided with duct type (or room type if indicated) smoke detectors in the return air as required by code, which shall deactivate unit and energize fire alarm upon detection of products-of-combustion. Duct detector shall be furnished by the Fire Alarm Contractor and installed by the Mechanical Contractor in compliance with NFPA 90A. Smoke detectors shall be provided as follows:
1. Each individual A/C unit greater than 2,000 cfm.
  2. Each A/C unit interconnected by ducted outside air distribution systems, regardless of individual unit size.
  3. Smoke detectors are not required for individual units at less than 2,000 cfm and served by individual outside air ventilation.
  4. Deactivation by smoke detector of any A/C unit shall also deactivate associated central outside air HVAC unit.

**2.04 AIR FILTERS**

- A. Air filters shall be provided for all A/C units, makeup air units, and all designated filtered return air grilles, as indicated on the plans.
- B. Air filters at A/C units, make up air units and grilles shall be 2" thick throwaway type, with 30% efficiency pleated media and frame, MERV8 minimum, similar and equal to "FARR" 30/30, or equal. Media shall be coated with an approved dust holding adhesive and construction shall be UL Class 2. Air pressure drop (clean) shall not exceed 0.18 inches W.G. at 2.5 cfm/nominal sq.in. face area. 18 gauge minimum galvanized steel holding frames for the filter cells shall be provided, as required, to make up filter assemblies for the scheduled air cfm quantities with a maximum filter face velocity of 500 fpm.

**2.05 THRU-WALL A/C UNITS**

- A. Units shall be package terminal type with interior room unit mounted at wall above floor, and through-wall condenser and ventilation assembly. Each unit shall be completely factory assembled, piped, internally wired and fully charged with R-410a refrigerant. Units shall be U.L. listed and certified in accordance with ARI Standards 310/380 for A/C units.
- B. Units shall be complete assemblies including compressor, evaporator and condenser coils, supply and condenser fans, isolation valves, electric heater, filter, drain pan, and refrigerant and temperature controls.
- C. Unit cabinets shall be insulated furniture steel chassis with enameled finish, or equal. Cabinet shall include integral top discharge supply grille, bottom return air inlet, drain pan with condensate drain connection, and electrical sub-base. Assembly shall also include insulated metal wall sleeve for condenser and ventilation sections with aluminum architectural grille painted to match building.
- D. Evaporator and condenser coils shall be of nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubes.
- E. Unit fans shall include multi-speed direct-drive centrifugal supply fan and axial-flow condenser fan, dynamically balanced, with thermal overload motor protection, permanently lubricated, and isolated mountings.

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- F. Units shall include hermetic rotary compressor and refrigerant circuit with thermal overload and overcurrent protection and internal vibration isolation.
- G. Units shall include electric auxiliary heater, open-coil type, with over-temperature protection device.
- H. Units shall include condensate removal system with condensate suction port and slinger ring. Each unit shall also include a filter section with replaceable filters.
- I. Each A/C unit shall include U.L. listed Short Circuit Current Rating (SCCR) in accordance with NEC. Minimum SCCR rating for each unit shall be not less than 5kA at rated voltage.
- J. Each A/C unit shall include stamped nameplate identification affixed to the exterior cabinet. Nameplate data shall include Manufacturer, Model No., Serial No., Unit volts, phase, MCA & MOCP, electric data for each component, gas heating input & pressure, and unit Short Circuit Current Rating (SCCR) in accordance with NEC.
  - 1. SCCR identification will not be required for any unit under 60 amp FLA.
- K. Units shall include factory controls with fan speed switch, fan/heat/cool/off switch, and temperature setpoint adjustment. Controls shall be accessible through hinged cover.
- L. Units shall be "Trane" Model PTAH, or equal, with capacities not less than those scheduled on the drawings.

### **PART 3 - INSTALLATION**

#### **3.01 EQUIPMENT**

- A. All heating and air conditioning equipment shall be installed in accordance with the details on the plans, and in strict conformance with the manufacturer's recommendations.

#### **3.02 ROOM THERMOSTATS**

- A. Room thermostats and transmitters shall be mounted in close proximity to lighting switches, aligned directly above such switches as detailed or as otherwise directed, except not above dimmer switches on rheostats. Mounting locations shall be unobstructed by free air current, and shall be subject to final approval by the Owner and Engineer. Mounting heights of room controllers shall be as required by ADA and TAS regulations. All room sensors only, or controllers not covered by ADA and TAS, shall otherwise be mounted at 5'-0" above finished floor, unless otherwise noted.

#### **3.03 MANUFACTURER'S START-UP SERVICE**

- A. At the completion of installation, complete start-up and inspection services shall be carried out for each A/C unit by a Manufacturer's Factory Representative. Representative shall be a Certified Service Technician directly employed by the unit manufacturer, and shall have thorough knowledge and experience in operation and service requirements of the installed equipment. Service shall include actual start-up operation for each unit, and verification of proper condition and installation of all unit components, refrigerant circuits and charge, motor bearings, lubrication and drives, and all unit operating and safety controls.

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- B. Service Technician shall set-up and configure unit controller to establish full interface with building DDC control system as required to receive and transmit all DDC control signals to carry-out all unit control functions as specified. Technician shall coordinate closely with DDC Control Contractor to achieve full interface, and shall commission all control sequences to verify proper unit operation.
- C. At completion of start-up and inspection service, Service Technician shall submit written report documenting proper operating condition of all A/C units.
- D. Manufacturer shall also furnish complete job-specific wiring diagrams and service bulletins for each type of A/C unit to be included in the operation and maintenance manual.

### **3.04 EQUIPMENT BASES**

- A. Provide as indicated on the plans or otherwise required, the various equipment bases. Unless noted, all floor-mounted equipment shall be furnished with a concrete base in addition to any required vibration isolation.
- B. Equipment bases in general shall be reinforced concrete, having # 3 steel reinforcing bars on 12" centers both ways, located approximately halfway between the top and bottom of the base. Outside dimensions shall be such that the concrete base extends approximately 4" beyond the equipment mounting base, unless otherwise specifically shown on the plans. Base depth shall be 4", or as otherwise specified or noted. All corners shall be chamfered 1".
- C. Mounting bolts shall be set in pipe sleeves, with 6" x 6" x 1/4" anchor plates, and shall be grouted-in after mounting equipment.

### **3.05 ROOF CURBS FOR ROOF-MOUNTED AIR CONDITIONING EQUIPMENT**

- A. Installation of roof-mounted equipment and roof curbs shall be in accordance with wind load requirements under the International Building Code, rated for 120 MPH wind speed, building Exposure Category C; and as detailed and noted on the Structural Drawings. Each curb shall be anchored to roof structure per Structural Drawings, and equipment shall be secured to curb with wind restraint brackets.
- B. Unit and curb installation shall also be in accordance with Manufacturer's instructions.
- C. Contractor shall provide wood blocking and shimming at the base of each curb, as required to maintain minimum flashing heights and insure level installation of each A/C unit and make up air unit.
- D. The interior of each curb shall be fully insulated with thermal and acoustic batt insulation between the roof deck and unit in an approved manner.
- E. Contractor shall refer to Architectural Specifications and Details for additional roof curb requirements. Each curb shall be arranged to accommodate external insulation and flashing around the perimeter as detailed.

### **3.06 AIR FILTERS**

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- A. Quantity and sizes of air filters shall be selected to cover the full face area of the A/C unit filter section. Air filters shall be installed and secured in the filter frame in a manner to prevent air gaps and leaks.
- B. New and replacement filters shall be furnished and installed as specified for all A/C units at each of the following points of construction.
  - 1. Initial unit installation to protect A/C units during construction.
  - 2. Immediately prior to final testing, balancing and commissioning.
  - 3. Project completion and Owner occupancy.
- C. All air filters provided throughout the course of the project shall be as specified for AIR FILTERS.

**3.07 VIBRATION AND NOISE CONTROL**

- A. Transmission of perceptible vibration, structure-borne noise or objectionable air borne noise by and/or from equipment installed to occupied areas will not be permitted. The Contractor shall submit for approval data showing disturbing frequency, support weight, static deflection or natural frequency and efficiency for each isolator and damper he proposes to use.
- B. All isolation material selections are to be based on laboratory published or factory certified data, proving that all such materials and usage comply with these specifications. Should any noise or vibration be objectionable to the Engineer, field instrumentation tests and measurements shall be made by the Contractor to determine the source, cause, and path of such disturbance. The Contractor shall correct any variance or non-compliance with the specification requirements in an approved manner at no additional cost to the Owner.
- C. All A/C units and fans shall be isolated from the building structure. In all cases, care must be taken to insure that all connections to the unit be sufficiently resilient to allow full undamped functioning of the unit isolators. This includes electrical raceway, ducts, drain, piping, etc.

**3.08 CLEANING, TESTING AND ADJUSTING**

- A. Transmission of perceptible vibration, structure-borne noise or objectionable air borne noise by and/or from equipment installed to occupied areas will not be permitted. The Contractor shall submit for approval data showing disturbing frequency, support weight, static deflection or natural frequency and efficiency for each isolator and damper he proposes to use.
- B. It is the intent of this section of the specifications to provide for all necessary tests during construction and at completion of the job to insure tight piping and ductwork installations, and to support the Test & Balance Contractor to establish correctly balanced systems as specified under Section 23 9900. This Contractor shall perform such tests and shall do any and all work required to accomplish this end. Completion work shall not take place until after completion of all final finishes, painting and ceiling tile.
- C. All strainers and filters shall be cleaned after pressure testing and system cleaning operations, and prior to final filling of systems.
- D. All air conditioning units shall be protected with disposable air filters until installation and testing is complete and satisfactory. New filter units shall then be installed at each unit as specified.

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- E. All motors, bearings, etc., on all equipment shall be correctly oiled and/or greased with the proper lubricant before the equipment is operated, and again at the completion of the job.
- F. External static pressures specified and scheduled in connection with the various fans, air handling systems, and water systems, may vary somewhat with job conditions and actual installations, and thus may or may not match exactly the scheduled design data for the installed systems. This Contractor shall assist and support the Test & Balance Contractor to test and adjust the completed systems as necessary to produce the specified air and water flow quantities, including provisions for all necessary dampers and valves, changing of fan speeds and the furnishing of new drives and motors where required.
- G. This Contractor shall operate the equipment installed by him for one (1) working day of eight (8) hours, and shall leave the equipment in perfect operating condition. During this period, he shall also instruct the Owner's representatives in the proper operation and maintenance of all equipment and systems.
- H. This Contractor shall furnish the Owner with three typed sets of complete operating instructions and maintenance schedules for the installed systems as a whole. Operating instructions shall first be submitted for approval. Maintenance schedules shall include, but not be limited to, complete lubricating instructions designating all oiling and greasing points for all equipment and designating type of lubricant to be used.
- I. Complete testing, adjusting and balancing services will be provided by a Test and Balance Agency under an independent TAB Subcontract with the General Contractor. The Mechanical Contractor shall coordinate and support TAB services as specified under Section 23 9900.

**END OF SECTION**

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SECTION 32 3113

CHAIN LINK FENCING (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

- A. Work required for this section includes chain link fencing and supplementary items necessary to complete their installation for the following:

1. Chain link fences.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.

1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.

- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.

- C. Samples for Verification: For the following products, in sizes indicated, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material to be used for the Work.

1. Polymer-Coated Steel Wire Fabric: 12 inch by 12 inch (300 mm by 300 mm) square.

2. Polymer-Coated Fencing Components and Accessories: 6 inch (150 mm) lengths for components such as posts, rails, and gate framing (as applicable); full-sized units for accessories.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of chain link fencing, from manufacturer.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the following to include in emergency, operation, and maintenance manuals:

1. Polymer finishes.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:

1. Experience: Installer's personnel with not less than 3 years of experience in the successful performance of Work similar to scope of this Project.

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2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 3 years of experience installing products and systems similar to scope of this Project.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 CHAIN LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:

1. Fabric Height: As indicated on Drawings.
2. Mesh Size and Diameter:
  - a. Heavy Duty Mesh Size and Wire Diameter: 2 inches (50 mm) mesh, 0.192 inch (4.88 mm) diameter.
3. Zinc-Coated Fabric: ASTM A 392, with zinc coating applied to steel wire before weaving according to ASTM A 817, Type II, zinc coated (galvanized) with Class 2 minimum coating weight of not less than 2.0 oz./sq. ft. (610 g/sq. m) of uncoated wire surface.
4. PVC-Coated Fabric: ASTM F 668, Class 2b over zinc-coated steel wire.
  - a. Color: As selected by Architect from manufacturer's full range complying with ASTM F 934.
5. Coat selvage ends of fabric that is metallic coated during the weaving process with manufacturer's standard clear protective coating.

- B. Selvage:

1. Fabric Height up to 6 feet (1.8 m): Knuckled at both selvages.
2. Fabric Height over 6 feet (1.8 m): Twisted top and knuckled bottom.

2.2 FENCE FRAMING

- A. Type I Round Steel Pipe: Standard weight, Schedule 40, galvanized steel pipe complying with ASTM F 1083. Comply with ASTM F 1043, Material Design Group IA, external and internal coating Type A, consisting of not less than 1.8-oz./sq. ft. (0.55-kg/sq. m) zinc.

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- B. Type II Round Steel Pipe: Cold-formed, electric-resistance-welded steel pipe. Comply with ASTM F 1043, Material Design Group IC, with minimum yield strength of 50,000-psi (344-MPa); and the following external and internal coatings requirements:
1. Coatings: Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
- C. Roll-Formed C-Section Steel Shapes: C-sections or other shape, produced from structural steel. Comply with ASTM F 1043, Material Design Group II, with minimum yield strength of 45,000 psi (310 MPa); and the following coating requirements:
1. Coating: Type A, consisting of not less than minimum 2.0-oz./sq. ft. (0.61-kg/sq. m) average zinc coating per ASTM A 123 or 4.0-oz./sq. ft. (1.22-kg/sq. m) zinc coating per ASTM A 653.
- D. Roll-Formed H-beam Steel Shapes: Hot-rolled H-beams or other shape, produced from structural steel. Comply with ASTM F 1043, Material Design Group III, with minimum yield strength of 45,000 psi (310 MPa); Coating Type A, consisting of not less than minimum 2.0-oz./sq. ft. (0.61-kg/sq. m) average zinc coating per ASTM A 123 or 4.0-oz./sq. ft. (1.22-kg/sq. m) zinc coating per ASTM A 653.
- E. Square Steel Tubing: Galvanized steel-tubing end, corner, and pull posts and top rail with coating Type A, consisting of not less than 1.8-oz./sq. ft. (0.55-kg/sq. m) zinc according to ASTM F 1043, and complying with CLFMI's "Product Manual," Type I.
- F. End, Corner and Pull Posts: For following fabric heights:
1. Fences up to 6 feet (1.8 m) in Height: 2.375 inches (60 mm) OD Type I or II steel pipe, 2 inches (50 mm) square steel tubing weighing 2.60 lb/ft (3.87 kg/m), or 3.5 by 3.5 inches (87 by 87 mm) roll-formed sections weighing 4.85 lb/ft (7.22 kg/m).
  2. Fences over 6 feet (1.8 m) in Height: 2.875 inches (73 mm) OD Type I or II steel pipe, 2.5 inches (62 mm) square steel tubing weighing 5.10 lb/ft (7.59 kg/m), or 3.5 by 3.5 inches (87 by 87 mm) roll-formed sections weighing 4.85 lb/ft (7.22 kg/m).
- G. Line or Intermediate Posts: For following fabric heights:
1. Fences up to 6 feet (1.8 m) in Height: 1.9 inches (48 mm) OD Type I or II steel pipe, 1.875 by 1.625 inches (48 by 40 mm) C section weighing 2.28 lb/ft (3.39 kg/m), or 2.25 by 1.7 inches (56 by 43 mm) steel H section weighing 3.26 lb/ft (7.22 kg/m).
  2. Fences over 6 feet (1.8 m) in Height: 2.375 inches (60 mm) OD Type I or II steel pipe, 2.25 by 1.7 inches (57 by 42 mm) C section weighing 2.70 lb/ft (4.02 kg/m), or 2.25 by 1.7 inches (56 by 43 mm) steel H section weighing 3.26 lb/ft (7.22 kg/m).
- H. Post Brace Rails: Match top rail for coating and strength and stiffness requirements. Provide brace rail with truss rod assembly for each gate (as applicable), end, and pull post. Provide two brace rails extending in opposing directions, each with truss rod assembly, for each corner post and for pull posts. Provide rail ends and clamps for attaching rails to posts.

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- I. Top Rails: Fabricate top rail from lengths 21 feet (6.2 m) or longer, with swaged-end or fabricated for expansion-type coupling, forming a continuous rail along top of chain link fabric. 1.66 inches (42 mm) O.D. Type 1 or 2 steel pipe or 1-1/4 by 1-5/8 inch (32 by 40 mm) C-section weighing 1.40 lb/ft (2.08 kg/m).
- J. Intermediate Rails: For fences over 6 feet (1.8 m) in height, provide intermediate rail. Match top rail for coating and strength and stiffness requirements.
- K. Bottom Rails: Match top rail for coating and strength and stiffness requirements.
- L. Polymer Coating: Provide framing components with polymer coating over metallic coating.
  - 1. Color: Match chain link fabric, complying with ASTM F 934.

## 2.3 FITTINGS

- A. General: Provide fittings for a complete fence installation, including special fittings for corners. Comply with ASTM F 626.
- B. Post and Line Caps: Hot-dip galvanized pressed steel or hot-dip galvanized cast iron. Provide weathertight closure cap for each post.
  - 1. Provide line post caps with loop to receive top rail.
- C. Rail and Brace Ends: Hot-dip galvanized pressed steel or hot-dip galvanized cast iron. Provide rail ends or other means for attaching rails securely to each gate (as applicable), corner, pull, and end post.
- D. Rail Fittings: Provide the following:
  - 1. Rail Sleeves for Top Rails: Hot-dip galvanized pressed steel or round steel tubing. Not less than 6 inches (150 mm) long.
  - 2. Rail Clamps for Intermediate and/or Bottom Rails: Hot-dip galvanized pressed steel. Provide line and corner boulevard clamps for connecting intermediate or bottom rails in the fence line to line posts.
- E. Tension and Brace Bands: Hot-dip galvanized pressed steel.
- F. Tension Bars: Hot-dip galvanized steel, length not less than 2 inches (50 mm) shorter than full height of chain link fabric. Provide one bar for each gate (as applicable) and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Hot-dip galvanized steel rod and turnbuckle or other means of adjustment.
- H. Tie Wires, Clips, and Fasteners: Provide the following types according to ASTM F 626:
  - 1. Standard Round Wire Ties: For attaching chain link fabric to posts, rails, and frames 0.106-inch- diameter wire; galvanized coating thickness matching coating thickness of chain link fence fabric.
  - 2. Power-driven fasteners for surface mounted posts on concrete.

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3. Round Wire Clips: Hot-dip galvanized steel for attaching chain link fabric to H-beam posts.
4. Round Wire Hog Rings: Hot-dip galvanized steel for attaching chain link fabric to horizontal tension wires.

I. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. (366 g /sq. m) zinc.
  - a. Polymer Coating: Provide fittings with polymer coating over metallic coating.
    - 1) Color: Match chain link fabric, complying with ASTM F 6264.

2.4 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.
- C. Pipe Sleeves: For posts set into concrete, provide preset hot-dip galvanized steel pipe sleeves complying with ASTM A 53, not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (12 mm) more than outside dimension of post, and flat steel plate forming bottom closure. Coordinate setting of sleeves with Division 03 Section "Cast-in-Place Concrete".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
  1. Respective manufacturer/fabricator's written installation instructions.
  2. Accepted submittals.
  3. Contract Documents.
  4. ASTM F 567 and more stringent requirements specified.

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- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

### 3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

### 3.4 FENCE POSTS SET IN ALREADY-CAST CONCRETE

- A. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
- B. Posts Set into Concrete in Voids: Where sleeves have not been cast into concrete, form or core drill holes not less than **5 inches (125 mm)** deep and **3/4 inch (19 mm)** larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

### 3.5 CHAIN LINK FENCE INSTALLATION

- A. Terminal Posts: Locate terminal end, corner, and gate posts (as applicable) per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.
- B. Line Posts: Space line posts uniformly at **10 feet (3 m)** o.c. maximum unless indicated otherwise on the drawings.
- C. Post Bracing Assemblies: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts (as applicable) and at both sides of corner and pull posts. Locate horizontal braces at mid-height of fabric on fences with top rail and at two-thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- D. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended by fencing manufacturer.
- E. Intermediate Rails: Install intermediate rails for fences over **6 feet (1.8 m)** in height. Install in one piece at post-height center span, spanning between posts, using fittings, special offset fittings, and accessories.
- F. Bottom Rails: Install, spanning between posts, using fittings and accessories.
- G. Chain Link Fabric: Apply fabric to outside of enclosing framework. Leave **2 inches (50 mm)** between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, and rails. Anchor to framework so fabric remains under tension after pulling force is released.

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- H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts (as applicable) with tension bands spaced not more than **15 inches (375 mm)** o.c.
- I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
  - 1. Maximum Spacing: Tie fabric to line posts **12 inches (300 mm)** o.c. and to braces **24 inches (600 mm)** o.c.
- J. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION

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