PROJECT MANUAL

REQUEST FOR PROPOSAL: 2025-04

UMC PHARMACY & ON-CALL ROOM RENOVATIONS

602 INDIANA AVENUE
LUBBOCK, TEXAS

A R C H I T E C T

C O N D R A Y

D E S I G N G R O U P I N C.

3708 UPLAND AVENUE
LUBBOCK, TEXAS 79407
(806) 748-6190

MECHANICAL, PLUMBING, and ELECTRICAL ENGINEERING
FINCHER ENGINEERING, LLC
5621 114th STREET, SUITE 100
LUBBOCK, TEXAS 79424
(806) 701-5109

CDG 22304
22509

DATE:
04/02/2025

Division	Section Title	Pages

PROCUREMENT AND CONTRACTING DOCUMENTS GROUP

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS
.....Envelope ComCheck, Mechanical ComCheck, Lighting ComCheck.....45
.....PUBLIC NOTICE.....1
001000.....REQUEST FOR PROPOSALS.....39
HUB SUBCONTRACTING PLAN FORMS
005000.....UMC PREVAILING WAGE RATES.....2
007000.....GENERAL CONDITIONS.....77

SPECIFICATIONS GROUP

General Requirements Subgroup

DIVISION 01 – GENERAL REQUIREMENTS
011000.....SUMMARY.....5
012500.....SUBSTITUTION PROCEDURES.....3
012600.....CONTRACT MODIFICATION PROCEDURES.....3
012900.....PAYMENT PROCEDURES.....8
013100.....PROJECT MANAGEMENT AND COORDINATION.....9
013200.....CONSTRUCTION PROGRESS DOCUMENTATION.....5
013233.....PHOTOGRAPHIC DOCUMENTATION.....3
013300.....SUBMITTAL PROCEDURES.....9
014000.....QUALITY REQUIREMENTS.....8
015000.....TEMPORARY FACILITIES AND CONTROLS.....10
016000.....PRODUCT REQUIREMENTS.....4
017300.....EXECUTION.....8
017700.....CLOSEOUT PROCEDURES.....5
017839.....PROJECT RECORD DOCUMENTS.....5

Facility Construction Subgroup

DIVISION 02 – EXISTING CONDITIONS
024119.....SELECTIVE DEMOLITION.....6

DIVISION 03 – 05
NOT APPLICABLE

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES
061000.....ROUGH CARPENTRY.....7
061600.....SHEATHING.....5

064116 .....PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS 7

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
072100 .....THERMAL AND SOUND INSULATION 3
078100 .....APPLIED FIREPROOFING 6
078413 .....PENETRATION FIRESTOPPING 5
078446 .....FIRE-RESISTIVE JOINT SYSTEMS 5
079200 .....JOINT SEALANTS 7
079500 .....EXPANSION CONTROL 5

DIVISION 08 – OPENINGS
081213 .....HOLLOW METAL FRAMES 6
081416 .....FLUSH WOOD DOORS 5
083113 .....ACCESS DOORS AND FRAMES 4
084113 .....ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS 8
087100 .....DOOR HARDWARE 11
088000 .....GLAZING 8
088300 .....MIRRORS 4

DIVISION 09 – FINISHES
092216 .....NON-STRUCTURAL METAL FRAMING 6
092900 .....GYPSUM BOARD 8
093000 .....TILING 9
095113 .....ACOUSTICAL PANEL CEILINGS 7
096513 .....RESILIENT BASE AND ACCESSORIES 4
096516 .....RESILIENT SHEET FLOORING 6
096813 .....TILE CARPETING 4
099123 .....INTERIOR PAINTING 7
099999 .....MATERIAL AND FINISH SCHEDULES – PROPOSAL ITEM #1 8
099999 .....MATERIAL AND FINISH SCHEDULES – PROPOSAL ITEM #2 5
099999 .....MATERIAL AND FINISH SCHEDULES – PROPOSAL ITEM #3 9

DIVISION 10 – SPECIALTIES
102600 .....WALL AND DOOR PROTECTION 6
102800 .....TOILET, BATH, AND LAUNDRY ACCESSORIES 4
104413 .....FIRE PROTECTION CABINETS 4
104416 .....FIRE EXTINGUISHERS 2
105113 .....METAL LOCKERS 6

DIVISION 11 – EQUIPMENT
NOT APPLICABLE

DIVISION 12 – FURNISHINGS
123661 .....SIMULATED STONE COUNTERTOPS 3

DIVISION 13 – 14
NOT APPLICABLE

Facility Services Subgroup

DIVISION 20 – RESERVED

DIVISION 21 – FIRE SUPPRESSION

210510 .....COMMON WORK RESULTS FOR FIRE SUPPRESSION 8
211313 .....WET-PIPE SPRINKLER SYSTEMS 10

DIVISION 22 – PLUMBING

220510 .....COMMON WORK RESULTS FOR PLUMBING 11
220523 .....GENERAL-DUTY VALVES FOR PLUMBING PIPING 3
220529 .....HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT 8
220553 .....IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT 3
220719 .....PLUMBING PIPING INSULATION 9
221116 .....DOMESTIC WATER PIPING 8
221119 .....DOMESTIC WATER PIPING SPECIALTIES 4
221316 .....SANITARY WASTE AND VENT PIPING 7
221319 .....SANITARY WASTE PIPING SPECIALTIES 3
224100 .....PLUMBING FIXTURES 5

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

230510 .....COMMON WORK RESULTS FOR HVAC 11
230529 .....HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT 8
230553 .....IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT 3
230590…….TEMPERATURE REGULATION 14
230593 .....TESTING, ADJUSTING, AND BALANCING FOR HVAC 10
230595…….MECHANICAL, FACILITY STARTUP/COMMISSIONING 5
230713 .....DUCT INSULATION 8
230910…….CRITICAL HVAC CONTROLS 9
233113…….METAL DUCTS 9
233300 .....AIR DUCT ACCESSORIES 7
233600 .....AIR TERMINAL UNITS 4
233713 .....DIFFUSERS, REGISTERS, AND GRILLES 2

DIVISIONS 24 - 25

NOT APPLICABLE

DIVISION 26 – ELECTRICAL

260410 .....MINOR ELECTRICAL DEMOLITION 3
260510 .....COMMON WORK RESULTS FOR ELECTRICAL 13
260519 .....LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES 4
260526 .....GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS 5
260529 .....HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS 5
260533 .....RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS 7
260553 .....IDENTIFICATION FOR ELECTRICAL SYSTEMS 7
260923 .....LIGHTING CONTROL DEVICES 4
262726 .....WIRING DEVICES 7

262913……ENCLOSED CONTROLLERS……6
265100.....INTERIOR LIGHTING.....5

DIVISION 27 – VOICE AND DATA COMMUNICATIONS
271500.....TELEPHONE AND DATA COMMUNICATIONS CABLING 6

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY
283111 .....DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM 8

DIVISION 29 – RESERVED
NOT APPLICABLE

Site and Infrastructure Subgroup

DIVISIONS 30 – 32
NOT APPLICABLE

Process Equipment Subgroup

DIVISIONS 33 – 49
NOT APPLICABLE

END OF TABLE OF CONTENTS

Division	Section Title	Pages
DIVISION 21 - FIRE SUPPRESSION		
210510	COMMON WORK RESULTS FOR FIRE SUPPRESSION	8
211313	WET-PIPE SPRINKLER SYSTEMS	10
DIVISION 22 - PLUMBING		
220510	COMMON WORK RESULTS FOR PLUMBING	11
220523	GENERAL-DUTY VALVES FOR PLUMBING PIPING	3
220529	HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT	8
220553	IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT	3
220719	PLUMBING PIPING INSULATION	9
221116	DOMESTIC WATER PIPING	8
221119	DOMESTIC WATER PIPING SPECIALTIES	4
221316	SANITARY WASTE AND VENT PIPING	7
221319	SANITARY WASTE PIPING SPECIALTIES	3
224100	PLUMBING FIXTURES	5
DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)		
230510	COMMON WORK RESULTS FOR HVAC	11
230529	HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT	8
230553	IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT	3
230590	TEMPERATURE REGULATION	14
230593	TESTING, ADJUSTING, AND BALANCING FOR HVAC	10
230595	MECHANICAL, FACILITY STARTUP/COMMISSIONING	5
230713	DUCT INSULATION	8
230910	CRITICAL HVAC CONTROLS	9
233113	METAL DUCTS	9
233300	AIR DUCT ACCESSORIES	7
233600	AIR TERMINAL UNITS	4
233713	DIFFUSERS, REGISTERS, AND GRILLES	2

By: Justin M. Fincher, P.E. #98476
Fincher Engineering, LLC
5621 114TH ST.
Suite 100
Lubbock, TX 79424
TX Firm #F-16408

04/02/2025

Division	Section Title	Pages
DIVISION 26 - ELECTRICAL		
260410	MINOR ELECTRICAL DEMOLITION	3
260510	COMMON WORK RESULTS FOR ELECTRICAL	13
260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES	4
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS	5
260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS	5
260533	RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS	7
260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS	7
260923	LIGHTING CONTROL DEVICES	4
262726	WIRING DEVICES	7
262913	ENCLOSED CONTROLLERS	6
265100	INTERIOR LIGHTING	5
DIVISION 27 - COMMUNICATIONS		
271500	TELEPHONE AND DATA COMMUNICATIONS CABLING	6
DIVISION 28 - ELECTRONIC SAFETY AND SECURITY		
283111	DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM WITH VOICE EVACUATION	8

By: Kris Stepp, P.E. #93736
Fincher Engineering, LLC
5621 114th St.
Suite 100
Lubbock, TX 79424
TX Firm #F-16408

04/02/2025

COM*check* Software Version COMcheckWeb

Mechanical Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	UMC Central Pharmacy Renovation and Office Relocation
Location:	Lubbock, Texas
Climate Zone:	3b
Project Type:	Alteration

Construction Site:
602 Indiana Avenue
Lubbock, Texas 79415

Owner/Agent:

Designer/Contractor:
Cory Cotton
Fincher Engineering
5621 114th St., Suite 100
Lubbock, Texas 79424
806-701-5109
cory@finchereng.com

Mechanical Systems List

Quantity	System Type & Description
1	Existing AHU (Multiple-Zone): Heating: 1 each - Hydronic or Steam Coil, Steam, Capacity = 360 kBtu/h No minimum efficiency requirement applies Cooling: 1 each - Hydronic Coil, Capacity = 360 kBtu/h, Water Economizer No minimum efficiency requirement applies Fan System: 10000 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: 10000 Supply, Multi-Zone VAV, 10000 CFM, 15.0 motor nameplate hp, 1.00 fan energy index

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Cory Cotton - Mechanical Designer
Name - Title

Cory Cotton
Signature

04/02/2025
Date

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 18.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical and service water heating systems and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. Hot water system sized per manufacturer's sizing guide.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5, C404.5.1, C404.5.2 [PL6][3]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME41][3]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.12.3 [ME61][2]	HVAC piping insulation insulated in accordance with Table C403.11.3. Insulation exposed to weather is protected from damage and is provided with shielding from solar radiation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.1 [ME65][3]	HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.8.3 [ME117][2]	Fans have a fan energy index (FEI) >= 1.00. Variable volume fans will have an FEI >= 0.95.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.4 [ME142][2]	Motors for fans that are not less than 1/12 hp and less than 1 hp are electronically commutated motors or have a minimum motor efficiency of 70 percent. These motors have the means to adjust motor speed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.6 [ME143][2]	Each DX cooling system > 65 kBtu and chiller water/evaporative cooling system with fans > 1/4 hp are designed to vary the indoor fan airflow as a function of load and comply with detailed requirements of this section.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.9 [ME144][2]	Large diameter fans where installed shall be tested and labeled in accordance with AMCA 230.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.13.1 [ME71][2]	Systems that heat outside the building envelope are radiant heat systems controlled by an occupancy sensing device or timer switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.3 [ME55][2]	HVAC equipment efficiency verified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.2.1 [ME112][3]	Zone isolation devices and controls installed where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.2.2 [ME59][1]	Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.7.1 [ME59][1]	Demand control ventilation provided for spaces >500 ft2 and >15 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.2 [ME115][3]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.3 [ME140][3]	Units that provide ventilation air to multiple zones and operate in combination with zone heating and cooling systems do not use heating or heat recovery to warm supply air to a temperature greater than 60°F when representative building loads or outdoor air temperatures indicate that the majority of zones require cooling.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.6 [ME141][3]	HVAC systems serving guestrooms in Group R-1 buildings with > 50 guestrooms: Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.4 [ME57][1]	Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.5 [ME116][3]	Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.12.1, C403.12.2 [ME60][2]	HVAC ducts and plenums insulated in accordance with C403.11.1 and constructed in accordance with C403.11.2, verification may need to occur during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.5.2 [ME16][1]	Economizer operation will not increase heating energy use during normal operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.5.4, C403.5.4.1, C403.5.4.2, C403.5.1 [ME15][1]	Water economizers provided where required, meet the requirements for design capacity, maximum pressure drop and integrated economizer control.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.1 [ME75][2]	Hydronic and multizone HVAC system controls are VAV fans driven by mechanical or electrical variable speed drive per Table C403.4.1.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.9 [ME67][2]	VAV fans have static pressure sensors located so controller setpoint <=1.2 w.c..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.3 [ME24][2]	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.3.1 [ME50][2]	Three-pipe hydronic systems using a common return for hot and chilled water are not used.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.5 [ME26][3]	Chilled water plants with multiple chillers have capability to reduce flow automatically through the chiller plant when a chiller is shut down. Boiler plants with multiple boilers have the capability to reduce flow automatically through the boiler plant when a boiler is shut down.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.1 [ME130][3]	Supply air systems serving multiple zones have VAV systems with controls configured to reduce the volume of air that is reheated, recooled or mixed in each zone. See section for details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.2 [ME131][3]	Single-duct VAV systems use terminal devices configured to reduce the supply of primary supply air before reheating or recooling takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.3 [ME132][3]	Systems that have 1 warm air duct and 1 cool air duct use terminal devices configured to reduce the flow from one duct to a minimum before mixing of air from the other duct takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.4 [ME133][3]	Individual dual-duct or mixing heating and cooling systems with a single fan and with total capacities > 90,000 Btu/h not equipped with air economizers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.5 [ME134][3]	Multiple zone HVAC systems have supply air temperature reset controls based on building loads or outside temperatures.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.7 [ME136][3]	Parallel-flow fan-powered VAV air terminals have automatic controls configured to 1) turn off the terminal fan except when space heating is required or where required for ventilation, 2) turn on the terminal fan as the first stage of heating before the heating coil is activated, and 3) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or, reverse the terminal damper logic and provide heating from the central air handler by primary air.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.8 [ME137][3]	Systems with DDC of individual zones reporting to the central control panel configured to reset the static pressure setpoint based on zone requiring the most pressure. The DDC is capable of monitoring zone damper positions or have an alternative method of indicating the need for static pressure. See section for details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.9 [ME138][3]	Static pressure sensors used to control VAV fans located such that the controller setpoint is <= 1.2 inches w.c.. Where this results in one or more sensors being located downstream of major duct splits, not less than one sensor located on each major branch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.4 [ME63][2]	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.6 [ME135][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.10.5 [ME31][3]	Condenser heat recovery system that can heat water to 85 ºF or provide 60% of peak heat rejection is installed for preheating of service hot water.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.2.1 [ME53][3]	Air outlets and zone terminal devices have means for air balancing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.2.2 [ME54][3]	HVAC hydronic heating and cooling coils have means to balance and have pressure test connections.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.11.3, C403.11.3.1, C403.11.3.2 [ME123][3]	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.11.3.1 and refrigeration compressor systems that comply with C403.11.3.2..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.3 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.1.1 [FI50][3]	HVAC systems and equipment design loads calculated in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.3.1 [FI27][3]	HVAC systems and equipment capacity does not exceed calculated loads.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1 [FI47][3]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.2 [FI38][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.3 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2 [FI39][3]	Each zone equipped with setback controls using automatic time clock or programmable control system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2.1, C403.4.2.2 [FI40][3]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2.3 [FI41][3]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406.3 [FI67][1]	Reduced lighting power - this credit specifies that the connected lighting power is >= 10% more efficient than 2021 IECC requirements.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.1 [FI28][1]	Commissioning plan developed by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.1 [FI31][1]	HVAC equipment, systems and system-to-system relationships have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.2 [FI10][1]	HVAC and service water heating control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.3 [FI32][1]	Economizers have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.4 [FI29][1]	Preliminary commissioning report completed and certified by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5 [FI7][3]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.1 [FI43][1]	An air and/or hydronic system balancing report is provided for HVAC systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.2 [FI30][1]	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

COM*check* Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	UMC Central Pharmacy Renovation and Office Relocation
Project Type:	Alteration

Construction Site:
602 Indiana Avenue
Lubbock, Texas 79415

Owner/Agent:

Designer/Contractor:
Ryan Kotulek
Fincher Engineering
5621 114th St., Suite 100
Lubbock, Texas 79424
806-701-5109
ryan@finchereng.com

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Pharmacy (Hospital)	7116	0.96	6831
		Total Allowed Watts =	6831

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Pharmacy (Hospital, 7116 sq.ft.)				
LED: A&AE: 2'X4' TROFFER: LED Panel 40W:	1	58	40	2320
LED: B&BE: CURVED LENS 2'X4': LED Panel 33W:	1	24	25	600
LED: C: 4' UNDERCABINET LIGHT: LED Undercabinet Unit 24W:	1	22	25	550
LED: C2: 2' UNDERCABINET LIGHT: LED Undercabinet Unit 12W:	1	2	12	24
LED: X: EXIT SIGN: LED Other Fixture Unit 6.5W:	1	5	2	10
			Total Proposed Watts =	3504

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Ryan Kotulek
Name - Title

Ryan Kotulek
Signature

4/3/2025
Date

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 18.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors, or emergency routes.
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors.
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors, or emergency routes.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4, C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406.3 [FI67][1]	Reduced lighting power - this credit specifies that the connected lighting power is >= 10% more efficient than 2021 IECC requirements.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

COM*check* Software Version COMcheckWeb

Mechanical Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	UMC OR Pharmacy
Location:	Lubbock, Texas
Climate Zone:	3b
Project Type:	Alteration

Construction Site:
602 Indiana Avenue
Lubbock, Texas 79415

Owner/Agent:

Designer/Contractor:
Cory Cotton
Fincher Engineering
5621 114th St., Suite 100
Lubbock, Texas 79424
806-701-5109
cory@finchereng.com

Mechanical Systems List

Quantity	System Type & Description
1	Existing AHU (Multiple-Zone): Heating: 1 each - Hydronic or Steam Coil, Steam, Capacity = 360 kBtu/h No minimum efficiency requirement applies Cooling: 1 each - Hydronic Coil, Capacity = 360 kBtu/h, Water Economizer No minimum efficiency requirement applies Fan System: 10000 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: 10000 Supply, Multi-Zone VAV, 10000 CFM, 15.0 motor nameplate hp, 1.00 fan energy index

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Cory Cotton - Mechanical Designer
Name - Title

Cory Cotton
Signature

04/02/2025
Date

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 19.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical and service water heating systems and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. Hot water system sized per manufacturer's sizing guide.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5, C404.5.1, C404.5.2 [PL6][3]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME41][3]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.12.3 [ME61][2]	HVAC piping insulation insulated in accordance with Table C403.11.3. Insulation exposed to weather is protected from damage and is provided with shielding from solar radiation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.1 [ME65][3]	HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.8.3 [ME117][2]	Fans have a fan energy index (FEI) >= 1.00. Variable volume fans will have an FEI >= 0.95.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.4 [ME142][2]	Motors for fans that are not less than 1/12 hp and less than 1 hp are electronically commutated motors or have a minimum motor efficiency of 70 percent. These motors have the means to adjust motor speed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.6 [ME143][2]	Each DX cooling system > 65 kBtu and chiller water/evaporative cooling system with fans > 1/4 hp are designed to vary the indoor fan airflow as a function of load and comply with detailed requirements of this section.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.9 [ME144][2]	Large diameter fans where installed shall be tested and labeled in accordance with AMCA 230.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.13.1 [ME71][2]	Systems that heat outside the building envelope are radiant heat systems controlled by an occupancy sensing device or timer switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.3 [ME55][2]	HVAC equipment efficiency verified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.2.1 [ME112][3]	Zone isolation devices and controls installed where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.2.2 [ME59][1]	Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.7.1 [ME59][1]	Demand control ventilation provided for spaces >500 ft2 and >15 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.2 [ME115][3]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.3 [ME140][3]	Units that provide ventilation air to multiple zones and operate in combination with zone heating and cooling systems do not use heating or heat recovery to warm supply air to a temperature greater than 60°F when representative building loads or outdoor air temperatures indicate that the majority of zones require cooling.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.6 [ME141][3]	HVAC systems serving guestrooms in Group R-1 buildings with > 50 guestrooms: Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.4 [ME57][1]	Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.5 [ME116][3]	Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.12.1, C403.12.2 [ME60][2]	HVAC ducts and plenums insulated in accordance with C403.11.1 and constructed in accordance with C403.11.2, verification may need to occur during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.5.2 [ME16][1]	Economizer operation will not increase heating energy use during normal operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.5.4, C403.5.4.1, C403.5.4.2, C403.5.1 [ME15][1]	Water economizers provided where required, meet the requirements for design capacity, maximum pressure drop and integrated economizer control.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.1 [ME75][2]	Hydronic and multizone HVAC system controls are VAV fans driven by mechanical or electrical variable speed drive per Table C403.4.1.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.9 [ME67][2]	VAV fans have static pressure sensors located so controller setpoint <=1.2 w.c..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.3 [ME24][2]	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.3.1 [ME50][2]	Three-pipe hydronic systems using a common return for hot and chilled water are not used.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.5 [ME26][3]	Chilled water plants with multiple chillers have capability to reduce flow automatically through the chiller plant when a chiller is shut down. Boiler plants with multiple boilers have the capability to reduce flow automatically through the boiler plant when a boiler is shut down.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.1 [ME130][3]	Supply air systems serving multiple zones have VAV systems with controls configured to reduce the volume of air that is reheated, recooled or mixed in each zone. See section for details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.2 [ME131][3]	Single-duct VAV systems use terminal devices configured to reduce the supply of primary supply air before reheating or recooling takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.3 [ME132][3]	Systems that have 1 warm air duct and 1 cool air duct use terminal devices configured to reduce the flow from one duct to a minimum before mixing of air from the other duct takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.4 [ME133][3]	Individual dual-duct or mixing heating and cooling systems with a single fan and with total capacities > 90,000 Btu/h not equipped with air economizers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.5 [ME134][3]	Multiple zone HVAC systems have supply air temperature reset controls based on building loads or outside temperatures.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.7 [ME136][3]	Parallel-flow fan-powered VAV air terminals have automatic controls configured to 1) turn off the terminal fan except when space heating is required or where required for ventilation, 2) turn on the terminal fan as the first stage of heating before the heating coil is activated, and 3) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or, reverse the terminal damper logic and provide heating from the central air handler by primary air.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.8 [ME137][3]	Systems with DDC of individual zones reporting to the central control panel configured to reset the static pressure setpoint based on zone requiring the most pressure. The DDC is capable of monitoring zone damper positions or have an alternative method of indicating the need for static pressure. See section for details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.9 [ME138][3]	Static pressure sensors used to control VAV fans located such that the controller setpoint is <= 1.2 inches w.c.. Where this results in one or more sensors being located downstream of major duct splits, not less than one sensor located on each major branch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.4 [ME63][2]	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.6 [ME135][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.10.5 [ME31][3]	Condenser heat recovery system that can heat water to 85 ºF or provide 60% of peak heat rejection is installed for preheating of service hot water.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.2.1 [ME53][3]	Air outlets and zone terminal devices have means for air balancing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.2.2 [ME54][3]	HVAC hydronic heating and cooling coils have means to balance and have pressure test connections.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.11.3, C403.11.3.1, C403.11.3.2 [ME123][3]	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.11.3.1 and refrigeration compressor systems that comply with C403.11.3.2..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.3 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.1.1 [FI50][3]	HVAC systems and equipment design loads calculated in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.3.1 [FI27][3]	HVAC systems and equipment capacity does not exceed calculated loads.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1 [FI47][3]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.2 [FI38][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.3 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2 [FI39][3]	Each zone equipped with setback controls using automatic time clock or programmable control system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2.1, C403.4.2.2 [FI40][3]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2.3 [FI41][3]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406.3 [FI67][1]	Reduced lighting power - this credit specifies that the connected lighting power is >= 10% more efficient than 2021 IECC requirements.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.1 [FI28][1]	Commissioning plan developed by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.1 [FI31][1]	HVAC equipment, systems and system-to-system relationships have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.2 [FI10][1]	HVAC and service water heating control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.3 [FI32][1]	Economizers have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.4 [FI29][1]	Preliminary commissioning report completed and certified by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5 [FI7][3]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.1 [FI43][1]	An air and/or hydronic system balancing report is provided for HVAC systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.2 [FI30][1]	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

COM*check* Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	UMC OR Pharmacy
Project Type:	Alteration

Construction Site:
602 Indiana Avenue
Lubbock, Texas 79415

Owner/Agent:

Designer/Contractor:
Ryan Kotulek
Fincher Engineering
5621 114th St., Suite 100
Lubbock, Texas 79424
806-701-5109
ryan@finchereng.com

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-OR Pharmacy (Hospital)	480	0.96	461
		Total Allowed Watts =	461

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
OR Pharmacy (Hospital, 480 sq.ft.)				
LED: A: 2'X4' TROFFER: LED Panel 40W:	1	8	40	320
LED: C: 4' UNDERCABINET LIGHT: LED Undercabinet Unit 24W:	1	2	25	50
			Total Proposed Watts =	370

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Ryan Kotulek
Name - Title

Signature

4/3/2025
Date

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 19.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Daylight spaces that comply with this code.
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors, or emergency routes.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4, C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406.3 [FI67][1]	Reduced lighting power - this credit specifies that the connected lighting power is >= 10% more efficient than 2021 IECC requirements.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

COM*check* Software Version COMcheckWeb

Mechanical Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	UMC On-Call Room Renovations
Location:	Lubbock, Texas
Climate Zone:	3b
Project Type:	Alteration

Construction Site:
602 Indiana Avenue
Lubbock, Texas 79415

Owner/Agent:

Designer/Contractor:
Cory Cotton
Fincher Engineering
5621 114th St., Suite 100
Lubbock, Texas 79424
806-701-5109
cory@finchereng.com

Mechanical Systems List

Quantity	System Type & Description
1	Existing AHU (Multiple-Zone): Heating: 1 each - Hydronic or Steam Coil, Steam, Capacity = 360 kBtu/h No minimum efficiency requirement applies Cooling: 1 each - Hydronic Coil, Capacity = 360 kBtu/h, Water Economizer No minimum efficiency requirement applies Fan System: 10000 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: 10000 Supply, Multi-Zone VAV, 10000 CFM, 15.0 motor nameplate hp, 1.00 fan energy index

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Cory Cotton - Mechanical Designer	Cory Cotton	04/02/2025
Name - Title	Signature	Date

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 18.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical and service water heating systems and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. Hot water system sized per manufacturer's sizing guide.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5, C404.5.1, C404.5.2 [PL6][3]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME41][3]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.12.3 [ME61][2]	HVAC piping insulation insulated in accordance with Table C403.11.3. Insulation exposed to weather is protected from damage and is provided with shielding from solar radiation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.1 [ME65][3]	HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.8.3 [ME117][2]	Fans have a fan energy index (FEI) >= 1.00. Variable volume fans will have an FEI >= 0.95.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.4 [ME142][2]	Motors for fans that are not less than 1/12 hp and less than 1 hp are electronically commutated motors or have a minimum motor efficiency of 70 percent. These motors have the means to adjust motor speed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.8.6 [ME143][2]	Each DX cooling system > 65 kBtu and chiller water/evaporative cooling system with fans > 1/4 hp are designed to vary the indoor fan airflow as a function of load and comply with detailed requirements of this section.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.9 [ME144][2]	Large diameter fans where installed shall be tested and labeled in accordance with AMCA 230.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.13.1 [ME71][2]	Systems that heat outside the building envelope are radiant heat systems controlled by an occupancy sensing device or timer switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.3 [ME55][2]	HVAC equipment efficiency verified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.2.1 [ME112][3]	Zone isolation devices and controls installed where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.2.2 [ME59][1]	Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.7.1 [ME59][1]	Demand control ventilation provided for spaces >500 ft2 and >15 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.2 [ME115][3]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.3 [ME140][3]	Units that provide ventilation air to multiple zones and operate in combination with zone heating and cooling systems do not use heating or heat recovery to warm supply air to a temperature greater than 60°F when representative building loads or outdoor air temperatures indicate that the majority of zones require cooling.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.6 [ME141][3]	HVAC systems serving guestrooms in Group R-1 buildings with > 50 guestrooms: Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.4 [ME57][1]	Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.7.5 [ME116][3]	Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.12.1, C403.12.2 [ME60][2]	HVAC ducts and plenums insulated in accordance with C403.11.1 and constructed in accordance with C403.11.2, verification may need to occur during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.5.2 [ME16][1]	Economizer operation will not increase heating energy use during normal operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.5.4, C403.5.4.1, C403.5.4.2, C403.5.1 [ME15][1]	Water economizers provided where required, meet the requirements for design capacity, maximum pressure drop and integrated economizer control.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.1 [ME75][2]	Hydronic and multizone HVAC system controls are VAV fans driven by mechanical or electrical variable speed drive per Table C403.4.1.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.9 [ME67][2]	VAV fans have static pressure sensors located so controller setpoint <=1.2 w.c..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.3 [ME24][2]	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.3.1 [ME50][2]	Three-pipe hydronic systems using a common return for hot and chilled water are not used.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.5 [ME26][3]	Chilled water plants with multiple chillers have capability to reduce flow automatically through the chiller plant when a chiller is shut down. Boiler plants with multiple boilers have the capability to reduce flow automatically through the boiler plant when a boiler is shut down.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.1 [ME130][3]	Supply air systems serving multiple zones have VAV systems with controls configured to reduce the volume of air that is reheated, recooled or mixed in each zone. See section for details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.2 [ME131][3]	Single-duct VAV systems use terminal devices configured to reduce the supply of primary supply air before reheating or recooling takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.3 [ME132][3]	Systems that have 1 warm air duct and 1 cool air duct use terminal devices configured to reduce the flow from one duct to a minimum before mixing of air from the other duct takes place.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.4 [ME133][3]	Individual dual-duct or mixing heating and cooling systems with a single fan and with total capacities > 90,000 Btu/h not equipped with air economizers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.5 [ME134][3]	Multiple zone HVAC systems have supply air temperature reset controls based on building loads or outside temperatures.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.7 [ME136][3]	Parallel-flow fan-powered VAV air terminals have automatic controls configured to 1) turn off the terminal fan except when space heating is required or where required for ventilation, 2) turn on the terminal fan as the first stage of heating before the heating coil is activated, and 3) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or, reverse the terminal damper logic and provide heating from the central air handler by primary air.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.6.8 [ME137][3]	Systems with DDC of individual zones reporting to the central control panel configured to reset the static pressure setpoint based on zone requiring the most pressure. The DDC is capable of monitoring zone damper positions or have an alternative method of indicating the need for static pressure. See section for details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.9 [ME138][3]	Static pressure sensors used to control VAV fans located such that the controller setpoint is <= 1.2 inches w.c.. Where this results in one or more sensors being located downstream of major duct splits, not less than one sensor located on each major branch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.4 [ME63][2]	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.6.6 [ME135][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.10.5 [ME31][3]	Condenser heat recovery system that can heat water to 85 ºF or provide 60% of peak heat rejection is installed for preheating of service hot water.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.2.1 [ME53][3]	Air outlets and zone terminal devices have means for air balancing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.2.2 [ME54][3]	HVAC hydronic heating and cooling coils have means to balance and have pressure test connections.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.11.3, C403.11.3.1, C403.11.3.2 [ME123][3]	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.11.3.1 and refrigeration compressor systems that comply with C403.11.3.2..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.3 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.1.1 [FI50][3]	HVAC systems and equipment design loads calculated in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.3.1 [FI27][3]	HVAC systems and equipment capacity does not exceed calculated loads.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1 [FI47][3]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.2 [FI38][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.1.3 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2 [FI39][3]	Each zone equipped with setback controls using automatic time clock or programmable control system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2.1, C403.4.2.2 [FI40][3]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.4.2.3 [FI41][3]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406.3 [FI67][1]	Reduced lighting power - this credit specifies that the connected lighting power is >= 10% more efficient than 2021 IECC requirements.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.1 [FI28][1]	Commissioning plan developed by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.1 [FI31][1]	HVAC equipment, systems and system-to-system relationships have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.2 [FI10][1]	HVAC and service water heating control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.3 [FI32][1]	Economizers have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.4 [FI29][1]	Preliminary commissioning report completed and certified by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5 [FI7][3]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.1 [FI43][1]	An air and/or hydronic system balancing report is provided for HVAC systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.2 [FI30][1]	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

COM*check* Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	UMC On-Call Room Renovations
Project Type:	Alteration

Construction Site:
602 Indiana Avenue
Lubbock, Texas 79415

Owner/Agent:

Designer/Contractor:
Ryan Kotulek
Fincher Engineering
5621 114th St., Suite 100
Lubbock, Texas 79424
806-701-5109
ryan@finchereng.com

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-On Call Rooms (Hospital)	8877	0.96	8522
		Total Allowed Watts =	8522

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
On Call Rooms (Hospital, 8877 sq.ft.)				
LED: A&AE: 2'X4' SELECTABLE FLAT PANEL: LED Panel 33W:	1	25	25	625
LED: B: 2'X2' SELECTABLE FLAT PANEL: LED Panel 19W:	1	36	20	720
LED: C: DECORATIVE WALL SCONCE: LED Other Fixture Unit 16W:	1	16	20	320
			Total Proposed Watts =	1665

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Ryan Kotulek — Name - Title

Ryan Kotulek — Signature

4/3/2025 — Date

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 18.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors, or emergency routes.
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors.
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Lighting that is related to means of egress in stairways, ramps, corridors, or emergency routes.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4, C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406.3 [FI67][1]	Reduced lighting power - this credit specifies that the connected lighting power is >= 10% more efficient than 2021 IECC requirements.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

PUBLIC NOTICE

REQUEST FOR PROPOSAL: 2025-04

The Lubbock County Hospital District will receive Competitive Sealed Proposals for the following University Medical Center project:

UMC PHARMACY & ON-CALL ROOM RENOVATIONS

The proposals will be received until **3:00 p.m., Wednesday, April 23, 2025,** at University Medical Center main campus in the Medical Office Plaza II, 808 Joliet Avenue, Suite 400, Lubbock, Texas 79415. Proposals will be opened and the proposer's name and dollar amounts to be read aloud.

A Pre-Proposal Conference will be held on **Monday, April 14, 2025 at 3:00 p.m.** at the project site located at University Medical Center, 602 Indiana Avenue, Lubbock, Texas 79415. Meet in MOP II, 4th Floor UMC Construction Conference Room.

Proposal documents and plans may be obtained upon request from The Reproduction Company at 2102 Avenue Q, Lubbock, TX, 79411 at the contractor's expense.

Please contact Misty McDonald at the office of the Architect at (806) 748-6190 or at misty@condray.com with questions.

Sincerely,

Maria "Alex" Villarreal
Contract Administrator
University Medical Center

UMC HEALTH SYSTEM

Service • Teamwork • Leadership

REQUEST FOR

COMPETITIVE SEALED PROPOSALS

CONSTRUCTION SERVICES

RFP Number: **2025-04**
UNIVERSITY MEDICAL CENTER
PHARMACY & ON-CALL ROOM RENOVATIONS

UMC MUST RECEIVE SEALED PROPOSALS BEFORE:
3:00 p.m., CST, Wednesday, April 23, 2025

NOTE: Proposal must either be received or time stamped by **Maria "Alex" Villarreal, Contract Administrator. Proposals will be received in the Medical Office Plaza II, 808 Joliet Avenue, Suite 400 Lubbock, TX 79415** before the hour and date specified for receipt of proposal.

UMC will receive sealed proposals until the date and time established for receipt. After receipt, only the names of Proposers and monetary amount of the proposals will be made public.

REFER INQUIRIES TO ARCHITECT:
Condray Design Group
Stacey Mincey
3708 Upland Avenue
Lubbock, Texas 79407
Email: stacey@condray.com
or
Telephone: (806) 748-6190

REQUEST FOR PROPOSALS

1. OWNER

University Medical Center
602 Indiana Avenue
Lubbock, Texas 79415

2. PROJECT

University Medical Center
Pharmacy & On-Call Room Renovations
602 Indiana Avenue
Lubbock, Texas 79415

3. ARCHITECT

Condray Design Group
3708 Upland Avenue
Lubbock, Texas 79407

4. DESCRIPTION

A. University Medical Center (UMC) is soliciting COMPETITIVE SEALED PROPOSALS for the renovation of the Central and OR Pharmacies and the On-Call Rooms located at the main campus**.** You are invited to submit a proposal for furnishing of all labor, materials, services, and equipment necessary for and incidental to the work as called for on the Drawings and in the Project Manual.
B. A contract will be awarded based on which proposal offers the best value to the Owner for the Project after the evaluation and ranking of proposals as described in the Instructions to Proposers.
C. Estimated Construction Budget: $3,000,000

5. BASIS OF PROPOSALS

A. Proposals shall be made on a stipulated sum basis on the attached forms for furnishing of all labor, materials, services, and equipment necessary for and incidental to the work as called for on the Drawings and in the Project Manual.
B. Owner will be utilizing the Competitive Sealed Proposal (CSP) procurement method as authorized by Texas Government Code, Chapter 2269.001 - .059, and Subchapter D. The selection criteria used to evaluate each proposer's proposal is stipulated in the Instructions to Proposers.

6. SUBMISSION OF PROPOSALS

A. Owner will receive sealed proposals until the given time, date, and location. Owner will consider proposals prepared in compliance with the Instruction to Proposers issued by the Owner, and delivered as follows:
B. Proposal Due Date: April 23, 2025
C. Proposal Due Time: 3:00 p.m.
D. Proposal Delivered to:

UMC Health System
Medical Office Plaza II
808 Joliet Avenue, Suite 400
Lubbock, Texas 79415
Attn: Maria "Alex" Villarreal, Contract Administrator

E. Sealed proposals will be received until the time and date specified for receipt.
F. Any proposals received after the deadline will be returned to the sender unopened.

7. PROPOSAL DOCUMENTS

A. Public Advertisements for this Project have been placed in the local newspaper on **April 6, 2025** and **April 20, 2025.**
B. Electronic Proposal Documents may be acquired from the office of the Architect beginning **April 7, 2025 at 4:00 p.m.** or after and at the following plan room the same day:
The Reproduction Co.
2102 Avenue Q
Lubbock, Texas 79411
C. General Contractors may secure an electronic copy of Proposal Documents from the Architect's FTP site as follows:
Download documents (.PDF file extension format) from
https://cdg.sharefile.com/d-sb774f0d73fc64c10b7b949be5299edbc
after registering as a plan holder. No cost or deposit required for this option.
D. Proposal Documents will not be provided to subcontract proposer.
E. No partial sets will be issued.

8. ADDENDA

A. Addenda will be issued to document holders by one of the following methods:
1. E-mail notification to document holder with link to download addenda from the Architect's office.
2. For document holders without e-mail, addenda may be picked up at the issuing office or mailed via the United States Postal Service (USPS).
B. Addenda will not be faxed to document holders.

9. PRE-PROPOSAL CONFERENCE

A. A Pre-Proposal Conference will be held **Monday, April 14, 2025 at 3:00 p.m.**, local time at the project site, 602 Indiana Avenue, Lubbock, Texas. Meet at the main hospital campus in Medical Office Plaza II, 4th Floor, Suite 400, UMC Construction Conference Room.
B. Any Proposer that does not attend, or does not sign in at the conference, will be considered absent.

10. PROPOSAL SECURITY

A. Proposal security in the sum of 5% of the total proposal amount and in the form of a cashier's check, certified check, or Surety Bond, shall accompany all proposals as stipulated in the Instruction to Proposers.

11. OPENING OF PROPOSALS

A. Proposals will be publicly opened in the identified location immediately after closing of time proposals are due, on the date due, to identify the names of each proposer and their respective

proposed cost.

B. No interviews will be conducted for this Proposal.

C. Within forty-five (45) days of opening the Proposals, the designated Selection Committee will convene in closed session to evaluate and rank each Proposal with respect to the published Selection Criteria. The designated Selection Committee shall select the highest ranked Proposer that submits the proposal that offers the best value for the Owner based on the published selection criteria and point system. The Owner shall first attempt to negotiate a contract with the selected Proposer. The Owner may discuss with the selected Proposer options for a scope or time modification and any price change associated with the modification. Other than the data read at the Proposal opening, the Owner shall not disclose any information derived from the Proposals submitted by competing proposers in conducting such discussions.

D. If the Owner is unable to negotiate a satisfactory contract with the selected Proposer, the Owner shall formally and in writing, end negotiations with that Proposer and proceed to negotiate with the next Proposer in the order of the selection ranking until a contract is reached or negotiations with all ranked Proposers end.

E. If the Owner negotiates a contract with a selected Proposer, the Owner will present the negotiated contract to the Owner's Finance Committee for recommendation of approval to the Owner's Board of Managers or directly to the Owner's Board of Managers.

F. It is the intent of the Owner to enter into a contract with the selected Proposer at the earliest scheduled Board Meeting. **(May 19, 2025)**

G. Following the Owner's award of a contract or Proposal rejection action, the Proposers will be notified by facsimile or e-mail message.

H. The award or rejection action regarding this Proposal is at the sole discretion of the Owner and the Owner makes no warranty regarding this Proposal that a contract will be awarded to any proposer.

I. The Owner agrees that if the Contract is awarded, it will be awarded to the Proposer offering the best value to the Owner. The Owner is not bound to accept the lowest priced Proposal if that Proposal is judged not to be the best value for the Owner, as determined by the Owner based on the selection criteria stated in the Request for Proposals.

12. PROPOSAL EVALUATION COMMITTEE

A. The Evaluation Committee will be composed of the following people:

Zach Sawyer, UMC	Stacey Mincey, CDG
Edward Munoz, UMC	Justin Fincher, Fincher Engineering
Tim McLean, McLean's Consulting	

B. All questions concerning the proposal shall be directed to Stacey Mincey, Architect.

13. FORMALITIES

A. The Owner reserves the right to waive irregularities and to reject all proposals.

B. Any interlineations or notation on any submitted proposal form must be initiated by the signer or the signer's designee for the proposal at the time of such marking.

C. Any interlineations or notation on the envelope and/or cover of the submitted proposal must be initiated by the signer or the signer's designee of the proposal at the time of such marking.

14. APPLICABLE GOVERNING LAWS AND REGULATIONS

A. In accordance with the Instruction to Proposers, all proposers shall comply with State Labor

Laws concerning prevailing wage rates.

15. PERFORMANCE, PAYMENT, AND PROPOSAL BONDS:

A. As a part of this proposal, each Proposer shall provide a Letter of Intent to issue Performance and Payment Bonds form the Proposer's bonding company listing availability of current bonding capacity and amount of work currently under bond. The Proposer shall establish through this letter the ability to provide the bonds in the amount of the published budget and schedule.

B. Before beginning the Work and, in any case, within ten (10) days after the contract is signed, the successful Proposer shall furnish Performance and Payment Bonds to the owner for 100% of the Contract Amount and in accordance with Texas Government Code Chapter 2253.

C. In addition to the Performance and Payment Bonds, the Proposer shall provide a good and sufficient proposal bond in the amount of 5% of the total estimated contract price. A proposal bond must be executed with a surety company authorized to do business in this state. See “Instructions to Proposers,” Section 5.2, “Proposal Security.”

16. CONSTRUCTION SCHEDULE:

A. It is the intent of the Owner to issue Notice to Proceed within two (2) weeks of the Board of Manager’s approval of the Proposal. The commencement date will be fixed in a Notice to Proceed.

END OF SECTION

INSTRUCTIONS TO PROPOSERS

ARTICLE 1 – DEFINITIONS

1.1 **Proposal Documents** include the Proposal Requirements and the proposed Contract Documents.

1.1.1 **Proposal Requirements** consist of the Advertisement of Proposals, Instructions to Proposers, the Proposal Form, and other sample proposal and contract forms.

1.1.2 **Contract Documents** consist of the Form of Agreement between the Owner and Contractor, Conditions of the Contract, Drawings, Project Manual that includes Specification Sections, and all Addenda issued prior to execution of the Contract.

1.2 **Definitions** set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Proposal Documents.

1.3 **Addenda** are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Proposal Documents by additions, deletions, clarifications or corrections.

1.4 A **Proposal** is a complete and properly signed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Proposal Documents.

1.5 The **Base Proposal** is the sum stated in the Proposal for which the Proposer offers to perform the Work described in the Proposal Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Proposals.

1.6 An **Alternate Proposal** (or Alternate) is an amount stated in the Proposal to be added to or deducted from the amount of the Base Proposal if the corresponding change in the Work, as described in the Proposal Documents, is accepted.

1.7 **Unit Price** is an amount stated in the Proposal as a price for measurement of materials, equipment or services or a portion of the Work as described in the Bidding Documents.

1.8 **Proposer** is a person or entity who submits a Proposal.

1.9 **Sub-proposer** is a person or entity who submits a proposal to a Proposer for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 – PROPOSER'S REPRESENTATIONS

2.1 Proposer, by making a Proposal, represents that:

2.1.1 Proposer has read and understands the Proposal Documents and the Proposal is made in accordance therewith.

2.1.2 Proposer has read and understands the Proposal Documents or Contract Documents, to the extent that such documentation related to the Work for the Proposal is submitted.

2.1.3 Proposer has visited the site and become familiar with local conditions under which the Work is to be performed and has correlated the Proposer's personal observations with the requirements of the proposed Contract Documents.

2.1.3.1 Proposer should be familiar with the adjacent working conditions.

2.1.4 The Proposal is based upon the materials, equipment and systems required by the Proposal Documents without exception.

ARTICLE 3 - PROPOSER COMMUNICATIONS

3.1 *Except as provided in this Proposal* and as otherwise necessary for the conduct of ongoing UMC business operations, Proposers are expressly and absolutely prohibited, directly or indirectly, from engaging in communications with system personnel who are involved in any manner in the review and/or evaluation of the proposals, selection of a proposer, and/or negotiation or formalization of any agreement or any other UMC person, including members of the Board of Managers, officers, agents, or other employees of UMC. **IF ANY PROPOSER ENGAGES IN CONDUCT OR COMMUNICATIONS THAT UMC DETERMINES IS CONTRARY TO THE PROHIBITIONS SET FORTH IN THIS SECTION, UMC MAY, AT ITS SOLE DISCRETION, DISQUALIFY THE PROPOSER AND WITHDRAW THE PROPOSER'S PROPOSAL FROM CONSIDERATION.**

3.2 UMC is committed to operating in an ethical and lawful manner. In addition to established policies and procedures for the resolution of concerns regarding UMC operations, UMC has selected a hotline service (EthicsPoint) for use by our employees, patients and their families, physicians, and other individuals/parties. The EthicsPoint hotline service is for any concern, including but not limited to compliance, patient care and safety, HIPAA privacy/security, Human Resources, workplace safety, vendor relations. The information provided to EthicsPoint will be sent to UMC on a confidential basis. While reporters can remain anonymous, leaving contact information is often helpful in investigating reports. Proposers who have concerns about inappropriate proposal activity may report those concerns to the EthicsPoint hotline by phone at 1-888-329-6445 or by website at https://secure.ethicspoint.com/domain/media/en/gui/23121/index.html. Proposers may also contact UMC's Chief Compliance Officer, Robert Brace, directly at 806-761-0995.

ARTICLE 4 – PROPOSAL DOCUMENTS

4.1 COPIES

4.1.1 Proposers may obtain complete digital sets of the Proposal Documents from **https://cdg.sharefile.com/d-sb774f0d73fc64c10b7b949be5299edbc** as stated in the Advertisement for Proposals.

4.1.2 Proposal Documents will not be issued directly to Sub-proposers or others unless specifically offered in the Advertisement for Proposals.

4.1.3 Proposers shall use complete sets of Proposal Documents in preparing Proposals; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

4.1.4 In making copies of the Proposal Documents available on the above terms, the Owner and the Architect do so only for the purpose of obtaining Proposals on the Work and do not confer a license or grant permission for any other use of the Proposal Documents.

4.2 INTERPRETATION OR CORRECTION OF PROPOSAL DOCUMENTS

4.2.1 The Proposer shall carefully study and compare the Proposal Documents with each other, and with other work being proposed concurrently or presently under construction to the extent that it relates to the Work for which the Proposal is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

4.2.2 Proposers and Sub-proposers requiring clarification or interpretation of the Proposal Documents shall make a written request which shall reach the Architect at least **seven (7) days** prior to the date for receipt of Proposals.

4.2.3 Interpretations, corrections and changes of the Proposal Documents will be made by Addendum. Interpretations, corrections and changes of the Proposal Documents made in another manner will not be binding, and Proposers shall not rely upon them.

4.3 SUBSTITUTIONS

4.3.1 Materials, products, and equipment described in the Proposal Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

4.3.2 No substitution will be considered prior to receipt of Proposals unless written request for approval has been received by the Architect at least **seven (7) days** prior to the date for receipt of Proposals. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. An item by item (line by line) comparison of each item listed in the specification shall be compiled and submitted comparing specified material/product with proposed substitution. A statement setting forth changes in other material, equipment or other portions of the Work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed substitution is upon the Proposer. Architect approval is for manufacturer only, and not specific material, system or equipment. Approved manufacturer's material, system or equipment is subject to additional and final review after award of contract and submitted for Architect's approval during Construction Administration submittal/shop drawing review process. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

4.3.3 If the Architect approves a proposed substitution prior to receipt of Proposals, such approval will be set forth in an Addendum. Proposers shall not rely upon approvals made in any other manner.

4.3.4 No substitutions will be considered after the Contract award unless otherwise specifically noted in the Proposal Documents.

4.4 ADDENDA

4.4.1 Addenda will be issued at the same FTP site and link listed above in 4.1, by email, or mail (if internet service is not available) to all who are known by the issuing office to have received a complete set of Proposal Documents. See Section 1.8 of the document titled Request for Proposals.

4.4.2 Copies of Addenda will be made available for inspection wherever Proposal Documents are on file for that purpose.

4.4.3 No Addenda will be issued later than two (2) days prior to the date for receipt of Proposals except an Addendum withdrawing the Request for Proposals or one which includes postponement of the date for receipt of Proposals.

4.4.4 Each Proposer shall ascertain, prior to submitting a Proposal, that the Proposer has received all Addenda issued, and the Proposer shall acknowledge their receipt in the Proposal.

ARTICLE 5 – PROPOSAL PROCEDURES

5.1 FORM AND STYLE OF PROPOSALS

5.1.1 Proposals shall be bound, include a table of contents, information located behind tabs and the requested information shall be organized and numbered (lettered) in the exact order as the selection criteria as listed in table titled **"AWARD SELECTION CRITERIA"** in Section 6.4.1 below.

5.1.2 Proposals shall be submitted on forms identical to the form included with the Proposal Documents.

5.1.3 All blanks of the proposal form shall be filled in by typewriter or manually, in ink.

5.1.4 Where so indicated by the makeup of the proposal form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.

5.1.5 Interlineations, alterations, and erasures, on any proposal form or envelope that contains any proposal whether handwritten, typed or printed, must be initialed by the signer of the Proposal or the signer's designee, or the Proposal may be considered invalid.

5.1.6 All requested Alternates shall be proposed. If no change in cost to the Base Proposal is required, mark "No Change."

5.1.7 Each copy of the Proposal shall include the legal name of the Proposer and a statement that the Proposer is a sole proprietor, partnership, corporation or other legal entity. Each copy shall be signed by a person or persons legally authorized to bind the Proposer to a contract. A Proposal by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Proposal submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Proposer.

5.1.8 All costs associated with the preparation, submission and delivery of Proposal is the sole responsibility of the Proposer.

5.1.9 The Proposer shall make no stipulations on the proposal form nor qualify the Proposal in any manner. Refer also to 5.1.5 above.

5.2 PROPOSAL SECURITY

5.2.1 Each Proposal shall be accompanied by a proposal security as stipulated in the Advertisement for Proposals, in the form and amount required, pledging that the Proposer

will enter into a Contract with the Owner on the terms stated in the proposal and will furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Proposer refuse to enter into such Contract, or fail to furnish such bonds, the amount of the proposal security shall be forfeited to the Owner as liquidated damages, not as a penalty.

5.2.2 The surety bond shall be written on AIA Document A310, Proposal Bond, or a similar standard for of the Surety, and the attorney-in-fact who executes the bond on behalf of the Surety, shall affix to the bond a certified and current copy of the power of attorney.

5.2.3 The Owner shall have the right to retain the proposal security of Proposers to whom an award is being considered until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Proposals may be withdrawn, or (c) all Proposals have been rejected.

5.3 SUBMISSION OF PROPOSALS

5.3.1 All copies of the Proposal, the proposal security and other documents required to be submitted with the Proposal shall be enclosed in a sealed opaque envelope. The envelope shall be addressed as indicated in the Invitation for Proposals and shall be identified with the Project name, the Proposer's name and address. If the Proposal is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED PROPOSAL ENCLOSED" on the face thereof. Any other interlineations or notations on the envelope must be initiated by the proposal signer or the signer's designee at the time of the interlineations or notations, or the proposal may be considered invalid.

5.3.2 Proposals shall be deposited at the designated location prior to the time and date for receipt of Proposals. Proposals received after the time and date for receipt of Proposals will be returned unopened.

5.3.3 The Proposer shall assume full responsibility for timely delivery at the location designated for receipt of Proposals.

5.3.4 Oral, telephonic, or telegraphic Proposals are invalid and will not receive consideration.

5.3.5 The Proposer shall be responsible for all costs associated with preparing the Competitive Sealed Proposal Document response. The Owner and Architect shall not incur any costs associated with the production and printing of Competitive Sealed Proposal Document and post proposal information.

5.3.6 The Proposer shall prepare two (2) flash drives with a digital copy and one (1) hard copy of the proposal information which will be sealed in an opaque envelope. Proposal Form and Procurement Form Supplement portion of the required documents can be turned in as a hard copy and will not be required to be included in the digital file.

5.4 MODIFICATION OR WITHDRAWAL OF PROPOSAL

5.4.1 A Proposal may not be modified, withdrawn or canceled by the Proposer during the stipulated time period following the time and date designated for the receipt of Proposals except as described in "Request for Proposals," Section 1.11 subsections C and D and each Proposer so agrees in submitting a Proposal.

5.4.2 Prior to the time and date designated for receipt of Proposals, a Proposal submitted may be modified or withdrawn by notice to the party receiving Proposals at the place designated for receipt of Proposals. Such notice shall be in writing over the signature of the Proposer or the Proposer's designee or by email; if by email, written confirmation over the signature of the Proposer shall be mailed and postmarked on or before the date and time set for receipt of Proposals. A change shall be so worded as not to reveal the amount of the original Proposal.

5.4.3 Withdrawn Proposals may be resubmitted up to the date and time designated for the receipt of Proposals provided that they are then fully in conformance with these Instructions to Proposers.

ARTICLE 6– CONSIDERATION OF PROPOSALS

6.1 OPENING OF PROPOSALS

As described in the "Request for Proposals," the properly identified Sealed Proposals, delivered on time, will be opened publicly, and the names of Proposers and their proposed cost will be read aloud.

6.2 REJECTION OF PROPOSALS

6.2.1 The Owner shall have the right to reject any, or all Proposals, reject a Proposal not accompanied by a required proposal security, or by other data required by the Proposal Documents, or reject a Proposal which is in any way incomplete or irregular.

6.2.2 The Owner shall have the right to reject any Proposal, in whole or in part, that proposes an Alternate if the Owner determines in its sole discretion that the Alternate proposed lacks sufficient information in the Proposal to address structural integrity and feasibility.

6.3 ACCEPTANCE OF PROPOSAL (AWARD)

6.3.1 After privately reviewing the opened Proposals, the designated Selection Committee will evaluate and rank each Proposal with respect to the published selection criteria in the section titled "Selection Criteria and Scoring Methodology." The designated Selection Committee shall select the highest ranked Proposer that submits the proposal that offers the best value for the Owner based on the published selection criteria and point system. The Owner shall first attempt to negotiate a contract with the selected Proposer. The Owner may discuss with the Proposer options for a scope or time modification and any price change associated with the modification. Other than the data read at the Proposal opening, the Owner shall not disclose any information derived from the Proposals submitted by competing proposers in conducting such discussions.

6.3.2 If the Owner is unable to negotiate a satisfactory contract with the selected Proposer, the Owner shall formally and in writing, end negotiations with that Proposer and proceed to negotiate with the next Proposer in the order of the selection ranking until a contract is reached or negotiations with all ranked Proposers end.

6.3.3 Owner shall have the right to accept or reject Alternates and/or Voluntary Alternates, if any, in any order or combination unless otherwise specifically provided in the Proposal Documents, and to determine the low Proposer on the basis of the sum of the Base Proposal and any Alternate accepted.

6.3.4 Each proposer agrees to waive any claim it has or may have against the Owner, the Architect, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any proposal.

6.4 SELECTION CRITERIA AND SCORING METHODOLOGY

6.4.1 Proposers will be selected using a weighted value that is explained below for each category of the Selection Criteria. The weighted value system assigns a specific ratio of valuation to each specific proposal relative to the base line lowest price proposed. The following explanation describes how the weighted value is determined for each selection criteria:

AWARD SELECTION CRITERIA		
Criteria	**Weighting Value**	**Methodology**
Construction Cost	45%	Each Proposed Price is divided by Low Price for a Price Differential. Calculated Final Score on price is based on the ratio of Low Price divided by Proposed Price multiplied by 45. Maximum possible score on Price = 45.
Construction Time	15%	Each Proposed Days (duration, in calendar days) is divided by Low Days for a Days Differential. Calculated Final Score on Days is based on the Low Days by Proposed Days multiplied by 15. Maximum possible score on Days = 15.
Proposed Team (including HUB Subcontracting Plan) & Healthcare Experience	40%	Designated Selection Committee will collectively evaluate and score each Proposal based on all relevant information. Criteria to be evaluated may include the factors below.
• Specific and relevant to this Project experience of Proposed Team, and commitment of Proposed Team for duration of this specific Project. • Experience of Proposed Team on UMC Projects and record of timely completion and on budget. • Past experience of Team and firm on UMC Projects as to the satisfaction of the performance of the Team with UMC staff. Additionally as to the satisfaction of the performance of the Team and Firm on projects outside UMC. • List of Subcontractors, including HUB Subcontracting Plan, and major Material Suppliers. The HUB Subcontracting Plan must meet the requirements under 34 Texas Administrative Code § 20.285. Information and forms are available from the first individual listed in Section 12.B of the Request for Proposals. • **HUB Subcontracting Plan and Procurement Form Supplement which includes list of subcontractors is due by Thursday, April 24, 2025 at 3:00 p.m. CST at the office of Maria "Alex" Villarreal, Contract Administrator, UMC Health System, Medical Office Plaza 1, 3502 9th Street, Suite 240, Lubbock, Texas 79415.**		

SCORING METHOD	
BASE SCORE	Criteria on Proposed Team & Firm Experience will be scored by the Selection Committee on a qualitative basis with the following scoring system: Outstanding/Superior - 10.0 points Very Good - 8.0 points Acceptable - 6.0 points Fair/Poor - 4.0 points Unacceptable - 2.0 points No information - 0.0 points
CUMULATIVE SCORE	Addition of final score on Construction Cost, Construction Time, and Team/Experience.
FINAL RANKING	Final ranking of Proposals based on final scoring of Proposals based on Final Cumulative Weighted Score.

ARTICLE 7 – POST-PROPOSAL INFORMATION

7.1 CONTRACTOR'S QUALIFICATION STATEMENT

Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305 – Contractor's Qualification Statement.

7.2 SUBMITTALS

7.2.1 The Proposer shall, as soon as practical, after notification of selection for the award, furnish to the Owner through the Architect in writing:

a. A designation of the Work to be performed with the Proposer's own forces.

b. Names of the manufacturers, products and the suppliers of principal items or systems of materials and equipment proposed for the Work; and

c. Names of subcontractors, persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

7.2.2 The Proposer will be required to establish, to the satisfaction of the Architect and Owner, the reliability and responsibility of the persons or entities proposed to furnish and perform the work described in the Proposal Documents.

ARTICLE 8 – PERFORMANCE BOND AND PAYMENT BOND

8.1 BOND REQUIREMENTS

8.1.1 The Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

8.1.2 The cost of bonds shall be included and identified in the Proposal.

8.2 TIME AND DELIVERY OF BONDS

8.2.1 The Proposer shall deliver the required bonds to the Owner prior to beginning the Work and, in any case, within ten (10) after the contract is signed.

8.2.2 The bonds shall be written on AIA Document A312, Performance Bond and Payment Bond or the Bonding Company's standard bond forms. Both bonds shall be written in the amount of the Contract Sum.

8.2.3 The bonds shall be dated on or after the date of the Contract.

8.2.4 The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety, to affix thereto a certified and current copy of the power of attorney.

ARTICLE 9 – INSURANCE REQUIREMENTS

9.1 **General Insurance Requirements.** Unless otherwise stated in the General Conditions or Special Conditions of the Contract, the successful Proposer ("Contractor") shall furnish insurance in the types and amounts indicated in this Request for the duration of the Contract.

9.1.1 The required insurance shall include coverage for Owner's property for preparation prior to construction, during construction and during the warranty period.

9.1.2 The insurance shall be evidenced by delivery to Owner of certificates of insurance executed by the insurer or its authorized agent stating coverages, limits, expiration dates and compliance with all applicable required provisions.

9.1.3 Coverage shall be written on an occurrence basis by companies authorized and admitted to do business in the State of Texas and rated A- or better by A.M. Best Company or similar rating company or otherwise acceptable to Owner.

9.1.4 Policies must include the following clauses, as applicable:

a. This insurance shall not be canceled, materially changed, or nonrenewed except after thirty (30) days written notice has been given to Owner.

b. It is agreed that Contractor's insurance shall be deemed primary with respect to any insurance or self-insurance carried by Owner for liability arising out of operations under the Contract with Owner.

c. Owner, its officials, directors, employees, representatives, and volunteers are added as additional insureds as respects operations and activities of, or on behalf of the named insured performed under Contract with Owner. The additional insured status must cover completed operations as well. This is not applicable to workers' compensation policies.

d. A waiver of subrogation in favor of Owner shall be provided in all policies.

9.2 **Workers' Compensation.** Insurance with limits as required by the Texas Workers' Compensation Act, with the policy endorsed to provide a waiver of subrogation as to Owner, employer's liability insurance of not less than: $100,000 each accident; $100,000 disease each employee; and $500,000

disease policy limit. Workers' compensation insurance coverage must meet the statutory requirements of Tex. Lab. Code § 401.011(44) and specific to construction projects for public entities as required by Tex. Lab. Code § 406.096.

9.3 **Commercial General Liability.** Including premises, operations, independent contractor's liability, products and completed operations and contractual liability, covering, but not limited to, the liability assumed under the indemnification provisions of the Contract, fully insuring Contractor's liability for bodily injury (including death) and property damage with a minimum limit of:

$1,000,000 per occurrence;
$2,000,000 general aggregate;
$2,000,000 products and completed operations aggregate;
and Coverage shall be on an "occurrence" basis.

The policy shall include coverage extended to apply to completed operations and explosion, collapse, and underground hazards. The policy shall include endorsement CG2503 Amendment of Aggregate Limits of Insurance (per Project) or its equivalent.

9.4 **Asbestos Abatement Liability Insurance**. Including coverage for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos containing materials. This requirement applies if the Work or the Project includes asbestos containing materials.

9.4.1 The combined single limit for bodily injury and property damage will be a minimum of $1,000,000 per occurrence.

9.4.2 Specific requirement for claims-made form: Required period of coverage will be determined by the following formula: continuous coverage for life of the Contract, plus one (1) year (to provide coverage for the warranty period), and an extended discovery period for a minimum of five (5) years which shall begin at the end of the warranty period.

9.4.3 Employer's liability limits for asbestos abatement will be:

$500,000 each accident;
$500,000 disease each employee; and
$500,000 disease policy limit.

9.4.4 If this Contract is for asbestos abatement only, the all-risk builder's risk or all-risk installation floater is not required.

9.5 **Comprehensive Automobile Liability Insurance.** Covering owned, hired, and non-owned vehicles, with a minimum combined single limit for bodily injury (including death) and property damage of $1,000,000 per occurrence. No aggregate shall be permitted for this type of coverage.

9.5.1 Such insurance is to include coverage for loading and unloading hazards.

9.5.2 Contractor or any subcontractor responsible for transporting asbestos or other hazardous materials defined as asbestos shall provide pollution coverage for any vehicle hauling asbestos containing cargo. The policy must include a Pollution Endorsement.

9.6 **All-Risk Builder's Risk Insurance.** Coverage shall be all-risk, including, but not limited to, fire, extended coverage, vandalism and malicious mischief, theft and, if applicable, flood, earth movement

and named storm.

9.6.1 Builder's risk and installation floater limits shall be equal to 100 percent of the Contract Sum plus, if any, existing property and Owner-furnished equipment specified by Owner.

9.6.2 The policy shall be written jointly in the names of Owner and Contractor. Subcontractors shall be named as additional insureds.

9.6.3 The policy shall have endorsements as follows:

a. This insurance shall be specific as to coverage and not contributing insurance with any permanent insurance maintained on the property.
b. This insurance shall not contain an occupancy clause suspending or reducing coverage should Owner partially occupy the Site and before the parties have determined Substantial Completion.
c. Loss, if any, shall be adjusted with and made payable to Owner as trustee for the insureds as their interests may appear. Owner shall be named as loss payee.
d. For renovation projects or projects that involve portions of Work contained within an existing structure, the Insurance and Bond Exhibit may have additional builder's risk insurance requirements.
e. For Owner furnished equipment or materials that will be in care, custody or control of Contractor, Contractor will be responsible for damage and loss.
f. For those properties located within a Tier 1 or 2 windstorm area, named storm coverage must be provided with limits specified by Owner.
g. For those properties located in flood prone areas, flood insurance coverage must be provided with limits specified by Owner.
h. Builder's risk insurance policy shall remain in effect until Substantial Completion.

9.7 **"Umbrella" Liability Insurance.** Contractor shall obtain, pay for and maintain umbrella liability insurance during the Contract term, insuring Contractor for an amount of not less than amount specified in the Insurance and Bonds Exhibit that provides coverage at least as broad as and applies in excess and follows form of the primary liability coverages required hereinabove. The policy shall provide "drop down" coverage where underlying primary insurance coverage limits are insufficient or exhausted.

9.8 **Delivery and Form.** The Contractor shall deliver the required certificates of insurance coverage to the Owner upon its execution of the Contract. The insurance certificate shall be written on a form acceptable to the Owner. Insurance shall be written in the amount required by the Contract. The insurance certificates shall be dated on or before the date of the Contract.

ARTICLE 10 – FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

The Agreement for the Work will be written on AIA Document A101 - 2017, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

ARTICLE 11 – APPLICABLE GOVERNING LAWS AND REGULATIONS

11.1 WAGE RATES

11.1.1 All Proposers must comply with State Labor Laws as required by current amended provisions of Tex. Gov't Code, Chapter 2258. Contractor is required to pay not less than the prevailing wage rate of per diem wages of the various applicable classes of labor.

11.1.2 The Contractor shall forfeit as a penalty to the Owner, $60.00 for each worker employed for each calendar day or portion thereof, if such worker is paid less than the said stipulated rates for any work done under said contract, by the contractor or by their subcontractor.

11.2 NON-DISCRIMINATION

During the bidding and, if successful, during performance of the Contract, the Proposer agrees they shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, or national origin. The Proposer shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, sex, religion, age, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Proposer agrees to post in conspicuous places, available to employees or applicants for employment, notices to be provided setting forth the provisions of this non-discrimination article.

END OF SECTION

PROPOSAL FORM

Date:_____, 2025

UMC Health System
Medical Office Plaza II
808 Joliet Avenue, Suite 400
Lubbock, Texas 79415

The undersigned, having carefully examined the proposal documents that include the specifications, drawings, and related documents entitled:

UNIVERSITY MEDICAL CENTER
PHARMACY & ON-CALL ROOM RENOVATIONS
602 INDIANA AVENUE
LUBBOCK, TEXAS 79415

all as prepared by Condray Design Group, 3708 Upland Avenue, Lubbock, Texas 79407, as well as having attended a Pre-Proposal Conference, and made an on-site inspection of the premises and all other conditions affecting the cost and/or execution of the work, proposes to furnish all materials, labor, and equipment necessary to complete the work in accordance with said documents, of which this proposal is a part, for the following sum:

BASE PROPOSAL – PROPOSAL ITEM #1 CENTRAL PHARMACY RENOVATION:

_____

Dollars ($_____)

(Note: All amounts shall be shown in both written and figure form. In case of discrepancy between the written amount and the figure, the written amount will govern. For alternates, check whether it is an add, deduct or no change.)

BASE PROPOSAL – PROPOSAL ITEM #2 OR PHARMACY RENOVATION:

_____

Dollars ($_____)

(Note: All amounts shall be shown in both written and figure form. In case of discrepancy between the written amount and the figure, the written amount will govern. For alternates, check whether it is an add, deduct or no change.)

BASE PROPOSAL – PROPOSAL ITEM #3 ON-CALL ROOM RENOVATIONS:

_____

Dollars ($_____)

(Note: All amounts shall be shown in both written and figure form. In case of discrepancy between the written amount and the figure, the written amount will govern. For alternates, check whether it is an add, deduct or no change.)

_____
CONTRACTOR'S PROJECT MANAGER
(Name Required)

_____
CONTRACTOR'S SUPERINTENDENT
(Name Required)

We have included, in the Proposal sum, all applicable taxes and all material allowances.

The undersigned acknowledges receipt of_____addenda to the Drawings and Project Manual as follows:

No. Date No. Date No. Date

No. Date No. Date No. Date

(The Proposer is to fill in I.D. Number and date of each thereby acknowledging receipt of Addenda).

If awarded the contract, the undersigned agrees to commence work under this contract on or before a date to be specified in Written Notice to Proceed, and to substantially complete the project within _____ (Proposer to fill in number) **calendar days** from said commencement date, unless modified by change order.

Notice to Proceed will be issued after material procurement has been completed and material is on site.

The **total calendar days above** will be divided into **six (6) Phases of the Project Scope of Work** as follows: (Proposer to fill in number of days associated with each Phase of Work.)

Phase 1 _____
Phase 2 _____
Phase 3 _____
Phase 4 _____
Phase 5 _____
Phase 6 _____

Proposer agrees to pay the Owner **$1,000.00** per day, as liquidated damages, for each day the substantial completion of this project extends beyond the stipulated substantial completion date.

If notified of the acceptance of this proposal within **seventy-five (75) days from the time set for the opening of proposals**, proposer agrees within ten (10) days of notification, to execute a contract in the form of the AIA Document A101-2017, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum, as amended for the above work, for the above stated compensation.

PROPOSAL SECURITY, as defined in the Advertisement For Proposals and Instructions to Proposers, which the Undersigned agrees to disposition of, as stated in Advertisement For Proposals and Instructions to Proposers, is attached to this Proposal.

Upon acceptance of this Proposal by Owner, Contractor shall furnish, before beginning the Work and, in any case, no later than ten (10) days after of the signing of the contract, a PERFORMANCE BOND AND LABOR/MATERIAL PAYMENT BOND, in the amount of 100% of the Contract Price. Surety shall meet requirements specified in the Owner/Contractor Agreement.

It is understood that the Owner reserves the right to accept or reject any and all Proposals and to waive all formalities in accordance with State law.

ATTACHMENTS

In accordance with Instructions to Proposers, the following documents will be submitted with and made a condition of the Proposal:

Proposal security in form of _____
Proposer's qualifications statement and supporting data.

The Procurement Form Supplement to be turned in to UMC no later than Twenty-Four (24) hours after Proposal Opening and to be made a condition of the Proposal.

Respectfully Submitted,

By: _____

Title: _____

Business Address with Zip Code (SEAL: If by Corporation)

_____

_____

_____

_____

Telephone Number with Area Code: _____

Fill in the applicable information:

A Corporation, chartered in the State of_____.

Authorized to do business in the State of Texas.

A Partnership, composed of_____, and

_____, and_____.

An Individual operating under the name of _____

_____.

Corporate Seal:

END OF SECTION

PROCUREMENT FORM SUPPLEMENT

To: UMC Health System
Medical Office Plaza 1
3502 9th Street, Suite 240
Lubbock, Texas 79415
Attn: Maria "Alex" Villarreal, Contract Administrator

Project: **University Medical Center**
Pharmacy & On-Call Room Renovations
602 Indiana Avenue
Lubbock, Texas 79415

Date: _____

Submitted by: _____
(full name)

Full Address _____

_____

In accordance with the Instructions to Proposers and the Proposal Form, we include the Proposal Form Supplements listed below designated as the Procurement Form Supplement. The information provided shall be considered an integral part of the Proposal Form.

This Procurement Form Supplement must be turned in to UMC Purchasing no later than Twenty-Four (24) hours after Proposal Opening.

Please provide the following information:

1. Mechanical Subcontractor (Included in Proposal Amount):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

1a. Mechanical Subcontractor (First Alternate):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

Total Change to Proposal Amount, Add / Deduct (circle one):

_____

1b. Mechanical Subcontractor (Second Alternate):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

Total Change to Proposal Amount, Add / Deduct (circle one):

_____

2. Plumbing Subcontractor (Included in Proposal Amount):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

2a. Plumbing Subcontractor (First Alternate):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

Total Change to Proposal Amount, Add / Deduct (circle one):

_____

2b. Plumbing Subcontractor (Second Alternate):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

Total Change to Proposal Amount, Add / Deduct (circle one):

_____

3. Electrical Subcontractor (Included in Proposal Amount):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

3a. Electrical Subcontractor (First Alternate):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

Total Change to Proposal Amount, Add / Deduct (circle one):

_____

3b. Electrical Subcontractor (Second Alternate):

Firm Name: _____

Address: _____

Phone No.: _____

Contact: _____

Total Change to Proposal Amount, Add / Deduct (circle one):

_____

4. Painting Subcontractor:

   Firm Name: _____

   Address: _____

   Phone No.: _____

   Contact: _____

5. Flooring Subcontractor:

   Firm Name: _____

   Address: _____

   Phone No.: _____

   Contact: _____

6. Fire Sprinkler Subcontractor:

   Firm Name: _____

   Address: _____

   Phone No.: _____

   Contact: _____

7. Millwork Subcontractor:

   Firm Name: _____

   Address: _____

   Phone No.: _____

   Contact: _____

8. Drywall and Ceiling Subcontractor:

   Firm Name: _____

   Address: _____

   Phone No.: _____

   Contact: _____

Please answer the following questions:

1. Is your principal place of business in Texas: Yes No
(Circle one)

2. If no, in which state is your principal place of business: _____

3. If your principal place of business is not Texas, does your state favor resident proposers in your state by some dollar increment or percentage? Yes No
(Circle one)

4. For information regarding this series of questions, see Tex. Gov't Code § 2252.002.

By submitting this form, signed below by authorized signing officer under the Proposer information on the Proposal Form, information contained within shall amend the Proposal.

Respectfully Submitted,

By: _____

Title: _____

END OF SECTION 001000

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____
Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____
Signature of vendor doing business with the governmental entity Date

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

VENDOR CONFLICT OF INTEREST DISCLOSURE

VENDOR QUESTIONNAIRE
Rev. 03/16/2018

Beginning January 1, 2006, all persons and entities that contract or contemplate contracting with local governmental entities must complete a vendor questionnaire. The form requires the vendor to disclose the following:

1) any business or other relationships with persons associated with the local government (UMC) who influence decisions over contracts

2) any business or other relationships with local government officers.

The questionnaire is attached, along with a list of UMC's local government officers.

UMC simply has to keep this on file and make it available if anyone asks. If any circumstances change, the vendor must file an updated questionnaire.

You have a contractual and legal obligation to update this form if applicable circumstances change.

GOVERNING BODY OF UMC HEALTH SYSTEM

President and Chief Executive Officer: Mark Funderburk, MBA, RHIA, FACHE

Board of Managers:

Gladys Whitten, DMD
John C. DeToledo, MD
Gary Greenstreet
Jason Medina
Mont McClendon
Mikella Newsom
Laura Vinson
Jolyn Wilkins

HUB Subcontracting Plan (HSP)

QUICK CHECKLIST

While this HSP Quick Checklist is being provided to merely assist you in readily identifying the sections of the HSP form that you will need to complete, it is very important that you adhere to the instructions in the HSP form and instructions provided by the contracting entity.

➤ **If you will be awarding <u>all</u> of the subcontracting work you have to offer under the contract to <u>only</u> Texas certified HUB vendors, complete:**

- ☐ Section 1 - Respondent and Requisition Information
- ☐ Section 2 a. - Yes, I will be subcontracting portions of the contract.
- ☐ Section 2 b. - List all the portions of work you will subcontract, and indicate the percentage of the contract you expect to award to Texas certified HUB vendors.
- ☐ Section 2 c. - Yes
- ☐ Section 4 - Affirmation
- ☐ GFE Method A (Attachment A) - Complete an Attachment A for each of the subcontracting opportunities you listed in Section 2 b.

➤ **If you will be subcontracting any portion of the contract to Texas certified HUB vendors and Non-HUB vendors, and the aggregate percentage of all the subcontracting work you will be awarding to the Texas certified HUB vendors with which you <u>do not</u> have a *<u>continuous contract</u>** in place for more than five (5) years *<u>meets or exceeds</u>* the HUB Goal the contracting entity identified in the "Entity Special Instructions/Additional Requirements", complete:**

- ☐ Section 1 - Respondent and Requisition Information
- ☐ Section 2 a. - Yes, I will be subcontracting portions of the contract.
- ☐ Section 2 b. - List all the portions of work you will subcontract, and indicate the percentage of the contract you expect to award to Texas certified HUB vendors and Non-HUB vendors.
- ☐ Section 2 c. - No
- ☐ Section 2 d. - Yes
- ☐ Section 4 - Affirmation
- ☐ GFE Method A (Attachment A) - Complete an Attachment A for each of the subcontracting opportunities you listed in Section 2 b.

➤ **If you will be subcontracting any portion of the contract to Texas certified HUB vendors and Non-HUB vendors or only to Non-HUB vendors, and the aggregate percentage of all the subcontracting work you will be awarding to the Texas certified HUB vendors with which you <u>do not</u> have a *<u>continuous contract</u>** in place for more than five (5) years *<u>does not meet or exceed</u>* the HUB Goal the contracting entity identified in the "Entity Special Instructions/Additional Requirements", complete:**

- ☐ Section 1 - Respondent and Requisition Information
- ☐ Section 2 a. - Yes, I will be subcontracting portions of the contract.
- ☐ Section 2 b. - List all the portions of work you will subcontract, and indicate the percentage of the contract you expect to award to Texas certified HUB vendors and Non-HUB vendors.
- ☐ Section 2 c. - No
- ☐ Section 2 d. - No
- ☐ Section 4 - Affirmation
- ☐ GFE Method B (Attachment B) - Complete an Attachment B for each of the subcontracting opportunities you listed in Section 2 b.

➤ **If you will not be subcontracting any portion of the contract and will be fulfilling the entire contract with your own resources (i.e., employees, supplies, materials and/or equipment), complete:**

- ☐ Section 1 - Respondent and Requisition Information
- ☐ Section 2 a. - No, I will not be subcontracting any portion of the contract, and I will be fulfilling the entire contract with my own resources.
- ☐ Section 3 - Self Performing Justification
- ☐ Section 4 - Affirmation

<u>Continuous Contract</u>:** ***Any existing written agreement (including any renewals that are exercised) between a prime contractor and a HUB vendor, where the HUB vendor provides the prime contractor with goods or service, to include under the same contract for a specified period of time. The frequency the HUB vendor is utilized or paid during the term of the contract is not relevant to whether the contract is considered continuous. Two or more contracts that run concurrently or overlap one another for different periods of time are considered to be individual contracts rather than renewals or extensions to the original contract. In such situations the prime contractor and HUB vendor are entering (have entered) into "new" contracts.

HUB Subcontracting Plan (HSP)

In accordance with Texas Gov't Code §2161.252, the contracting entity has determined that subcontracting opportunities are probable under this contract. Therefore, all respondents, including State of Texas certified Historically Underutilized Businesses (HUBs) must complete and submit this State of Texas HUB Subcontracting Plan (HSP) with their response to the bid requisition (solicitation).

NOTE: Responses that do not include a completed HSP shall be rejected pursuant to Texas Gov't Code §2161.252(b).

The HUB Program promotes equal business opportunities for economically disadvantaged persons to contract with the Texas governmental entities in accordance with the goals specified in the 2009 State of Texas Disparity Study. The statewide HUB goals defined in 34 Texas Administrative Code (TAC) §20.284 are:

- ***11.2 percent for heavy construction other than building contracts,***
- ***21.1 percent for all building construction, including general contractors and operative builders' contracts,***
- ***32.9 percent for all special trade construction contracts,***
- ***23.7 percent for professional services contracts,***
- ***26.0 percent for all other services contracts, and***
- ***21.1 percent for commodities contracts.***

- - Entity Special Instructions/Additional Requirements - -

*In accordance with 34 TAC §20.285(d)(1)(D)(iii), a respondent (prime contractor) may demonstrate good faith effort to utilize Texas certified HUBs for its subcontracting opportunities if the total value of the respondent's subcontracts with Texas certified HUBs meets or exceeds the statewide HUB goal or the entity specific HUB goal, whichever is higher. When a respondent uses this method to demonstrate good faith effort, the respondent must identify the HUBs with which it will subcontract. If using existing contracts with Texas certified HUBs to satisfy this requirement, only the aggregate percentage of the contracts expected to be subcontracted to HUBs with which the respondent **does not** have a **continuous contract*** in place for **more than five (5) years** shall qualify for meeting the HUB goal. This limitation is designed to encourage vendor rotation as recommended by the 2009 Texas Disparity Study.*

SECTION 1: RESPONDENT AND REQUISITION INFORMATION

a. Respondent (Company) Name: _____ State of Texas VID #: _____

Point of Contact: _____ Phone #: _____

E-mail Address: _____ Fax #: _____

b. Is your company a State of Texas certified HUB? ☐ **- Yes** ☐ **- No**

c. Requisition #: _____ Bid Open Date: _____ **(mm/dd/yyyy)**

Enter your company's name here: _____ Requisition #: _____

SECTION 2: RESPONDENT'S SUBCONTRACTING INTENTIONS

After dividing the contract work into reasonable lots or portions to the extent consistent with prudent industry practices, and taking into consideration the scope of work to be performed under the proposed contract, including all potential subcontracting opportunities, the respondent must determine what portions of work, **including contracted staffing, goods and services will be subcontracted**. Note: In accordance with 34 TAC §20.282, a "Subcontractor" means a person who contracts with a prime contractor to work, to supply commodities, or to contribute toward completing work for a governmental entity.

a. Check the appropriate box (Yes or No) that identifies your subcontracting intentions:

☐ - ***Yes***, I will be subcontracting portions of the contract. (If ***Yes***, complete Item b of this SECTION and continue to Item c of this SECTION.)

☐ - ***No***, I will not be subcontracting any portion of the contract, and I will be fulfilling the entire contract with my own resources, including employees, goods and services. (If ***No***, continue to SECTION 3 and SECTION 4.)

b. List all the portions of work (subcontracting opportunities) you will subcontract. Also, based on the total value of the contract, identify the percentages of the contract you expect to award to Texas certified HUBs, and the percentage of the contract you expect to award to vendors that are not a Texas certified HUB (i.e., Non-HUB).

Item #	Subcontracting Opportunity Description	HUBs		Non-HUBs
		Percentage of the contract expected to be subcontracted to HUBs with which you do not have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to HUBs with which you have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to non-HUBs.
1		%	%	%
2		%	%	%
3		%	%	%
4		%	%	%
5		%	%	%
6		%	%	%
7		%	%	%
8		%	%	%
9		%	%	%
10		%	%	%
11		%	%	%
12		%	%	%
13		%	%	%
14		%	%	%
15		%	%	%
	Aggregate percentages of the contract expected to be subcontracted:	**%**	**%**	**%**

(Note: If you have more than fifteen subcontracting opportunities, you may continue on the next page, which you may also photo-copy as necessary.)

c. Check the appropriate box (Yes or No) that indicates whether you will be using **only** Texas certified HUBs to perform **all** of the subcontracting opportunities you listed in SECTION 2, Item b.

☐ - ***Yes*** (If ***Yes***, continue to SECTION 4 and complete an "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed.)

☐ - ***No*** (If ***No***, continue to Item d, of this SECTION.)

d. Check the appropriate box (Yes or No) that indicates whether the aggregate expected percentage of the contract you will subcontract **with Texas certified HUBs** with which you **do not** have a **continuous contract*** in place with for **more than five (5) years**, **meets or exceeds** the HUB goal the contracting entity identified on page 1 in the "**Entity Special Instructions/Additional Requirements**."

☐ - ***Yes*** (If ***Yes***, continue to SECTION 4 and complete an "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed.)

☐ - ***No*** (If ***No***, continue to SECTION 4 and complete an "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed.)

****Continuous Contract**: Any existing written agreement (including any renewals that are exercised) between a prime contractor and a HUB vendor, where the HUB vendor provides the prime contractor with goods or service under the same contract for a specified period of time. The frequency the HUB vendor is utilized or paid during the term of the contract is not relevant to whether the contract is considered continuous. Two or more contracts that run concurrently or overlap one another for different periods of time are considered to be individual contracts rather than renewals or extensions to the original contract. In such situations the prime contractor and HUB vendor are entering (have entered) into "new" contracts.*

Enter your company's name here: _____ Requisition #: _____

SECTION 2: RESPONDENT'S SUBCONTRACTING INTENTIONS (CONTINUATION SHEET)

This page can be used as a continuation sheet to the HSP Form's page 2, Section 2, Item b. Continue listing the portions of work (subcontracting opportunities) you will subcontract. Also, based on the total value of the contract, identify the percentages of the contract you expect to award to Texas certified HUBs, and the percentage of the contract you expect to award to vendors that are not a Texas certified HUB (i.e., Non-HUB). You may photo-copy this page.

Item #	Subcontracting Opportunity Description	HUBs		Non-HUBs
		Percentage of the contract expected to be subcontracted to HUBs with which you do not have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to HUBs with which you have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to non-HUBs.
16		%	%	%
17		%	%	%
18		%	%	%
19		%	%	%
20		%	%	%
21		%	%	%
22		%	%	%
23		%	%	%
24		%	%	%
25		%	%	%
26		%	%	%
27		%	%	%
28		%	%	%
29		%	%	%
30		%	%	%
31		%	%	%
32		%	%	%
33		%	%	%
34		%	%	%
35		%	%	%
36		%	%	%
37		%	%	%
38		%	%	%
39		%	%	%
40		%	%	%
41		%	%	%
42		%	%	%
43		%	%	%
	Aggregate percentages of the contract expected to be subcontracted:	**%**	**%**	**%**

***Continuous Contract**: Any existing written agreement (including any renewals that are exercised) between a prime contractor and a HUB vendor, where the HUB vendor provides the prime contractor with goods or service under the same contract for a specified period of time. The frequency the HUB vendor is utilized or paid during the term of the contract is not relevant to whether the contract is considered continuous. Two or more contracts that run concurrently or overlap one another for different periods of time are considered to be individual contracts rather than renewals or extensions to the original contract. In such situations the prime contractor and HUB vendor are entering (have entered) into "new" contracts.*

Enter your company's name here: _____ Requisition #: _____

SECTION 3: SELF PERFORMING JUSTIFICATION **(If you responded "No" to SECTION 2, Item a, you must complete this SECTION and continue to SECTION 4.)** If you responded "No" to SECTION 2, Item a, in the space provided below **explain how** your company will perform the entire contract with its own employees, supplies, materials and/or equipment.

SECTION 4: AFFIRMATION

As evidenced by my signature below, I affirm that I am an authorized representative of the respondent listed in SECTION 1, and that the information and supporting documentation submitted with the HSP is true and correct. Respondent understands and agrees that, if awarded any portion of the requisition:

- The respondent will provide notice as soon as practical to all the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor for the awarded contract**.** The notice must specify at a minimum the contracting entity's name and its point of contact for the contract, the contract award number (as applicable), the subcontracting opportunity they (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting entity's point of contact for the contract no later than ten (10) working days after the contract is awarded.

Signature	Printed Name	Title	Date (mm/dd/yyyy)

Reminder:

- If you responded "**Yes**" to **SECTION 2, Items c or d**, you must complete an "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed in SECTION 2, Item b.
- If you responded "**No**" **SECTION 2, Items c and d,** you must complete an "HSP Good Faith Effort **-** Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in SECTION 2, Item b.

HSP Good Faith Effort - Method A (Attachment A)

Enter your company's name here: _____ Requisition #: _____

IMPORTANT: If you responded "***Yes***" to **SECTION 2, Items c** or **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page.

SECTION A-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: _____ **Description:** _____

SECTION A-2: SUBCONTRACTOR SELECTION

List the subcontractor(s) you selected to perform the subcontracting opportunity you listed above in SECTION A-1. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Employer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to all the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting entity's name and its point of contact for the contract, the contract award number (as applicable), the subcontracting opportunity they (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting entity's point of contact for the contract no later than ten (10) working days after the contract is awarded.

HSP Good Faith Effort - Method B (Attachment B)

Enter your company's name here: _____ Requisition #: _____

IMPORTANT*:** If you responded "No***" to **SECTION 2, Items c** and **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page.

SECTION B-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: _____ **Description:** _____

SECTION B-2: MENTOR PROTÉGÉ PROGRAM

If respondent is participating as a Mentor in a State of Texas Mentor Protégé Program, submitting its Protégé (Protégé must be a State of Texas certified HUB) as a subcontractor to perform the subcontracting opportunity listed in **SECTION B-1**, constitutes a good faith effort to subcontract with a Texas certified HUB towards that specific portion of work.

Check the appropriate box (Yes or No) that indicates whether you will be subcontracting the portion of work you listed in SECTION B-1 to your Protégé.

☐ **- Yes** (If ***Yes***, continue to SECTION B-4.)

☐ **- No / Not Applicable** (If ***No*** or ***Not Applicable***, continue to SECTION B-3 and SECTION B-4.)

SECTION B-3: NOTIFICATION OF SUBCONTRACTING OPPORTUNITY

When completing this section you MUST comply with items **a**, **b**, **c** and **d**, thereby demonstrating your Good Faith Effort of having notified Texas certified HUBs and trade organizations or development centers about the subcontracting opportunity you listed in SECTION B-1. Your notice should include the scope of work, information regarding the location to review plans and specifications, bonding and insurance requirements, required qualifications, and identify a contact person. When sending notice of your subcontracting opportunity, you are encouraged to use the attached HUB Subcontracting Opportunity Notice form.

Retain supporting documentation (i.e., certified letter, fax, e-mail) demonstrating evidence of your good faith effort to notify the Texas certified HUBs and trade organizations or development centers. Also, be mindful that a working day is considered a normal business day of a governmental entity, not including weekends, federal or state holidays, or days the entity is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.

a. Provide written notification of the subcontracting opportunity you listed in SECTION B-1, to three (3) or more Texas certified HUBs. Unless the contracting entity specified a different time period, you must allow the HUBs at least seven (7) working days to respond to the notice prior to you submitting your bid response to the contracting entity. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

b. List the **three (3) Texas certified HUBs** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the company's Texas Vendor Identification (VID) Number, the date you sent notice to that company, and indicate whether it was responsive or non-responsive to your subcontracting opportunity notice.

Company Name	Texas VID (Do not enter Social Security Numbers.)	Date Notice Sent (mm/dd/yyyy)	Did the HUB Respond?
			☐ - Yes ☐ - No
			☐ - Yes ☐ - No
			☐ - Yes ☐ - No

c. Provide written notification of the subcontracting opportunity you listed in SECTION B-1 to two (2) or more trade organizations or development centers in Texas to assist in identifying potential HUBs by disseminating the subcontracting opportunity to their members/participants. Unless the contracting entity specified a different time period, you must provide your subcontracting opportunity notice to trade organizations or development centers at least seven (7) working days prior to submitting your bid response to the contracting entity. A list of trade organizations and development centers that have expressed an interest in receiving notices of subcontracting opportunities is available on the Statewide HUB Program's webpage at https://www.comptroller.texas.gov/purchasing/vendor/hub/resources.php.

d. List **two (2) trade organizations or development centers** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the date when you sent notice to it and indicate if it accepted or rejected your notice.

Trade Organizations or Development Centers	Date Notice Sent (mm/dd/yyyy)	Was the Notice Accepted?
		☐ - Yes ☐ - No
		☐ - Yes ☐ - No

HSP Good Faith Effort - Method B (Attachment B) Cont.

Enter your company's name here: _____ Requisition #: _____

SECTION B-4: SUBCONTRACTOR SELECTION

Enter the item number and description of the subcontracting opportunity you listed in **SECTION 2, Item b,** of the completed HSP form for which you are completing the attachment. You may photo-copy this page.

a. Enter the item number and description of the subcontracting opportunity for which you are completing this Attachment B continuation page.

Item Number: _____ **Description:** _____

b. List the subcontractor(s) you selected to perform the subcontracting opportunity you listed in **SECTION B-1**. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Emplioyer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

c. If any of the subcontractors you have selected to perform the subcontracting opportunity you listed in **SECTION B-1** is **not** a Texas certified HUB, provide written justification for your selection process (attach additional page if necessary):

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to **all** the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting entity's name and its point of contact for the contract, the contract award number (as applicable), the subcontracting opportunity it (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting entity's point of contact for the contract no later than ten (10) working days after the contract is awarded.

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each governmental entity that considers entering into a contract with an expected value of $100,000 or more shall, before the entity solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The governmental entity I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.285 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting entity. In addition, at least seven (7) working days prior to submitting its bid response to the contracting entity, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code §20.282(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION A: PRIME CONTRACTOR'S INFORMATION

Company Name: _____ **State of Texas VID #:** _____

Point-of-Contact: _____ **Phone #:** _____

E-mail Address: _____ **Fax #:** _____

SECTION B: CONTRACTING GOVERNMENTAL ENTITY AND REQUISITION INFORMATION

Name: _____

Point-of-Contact: _____ **Phone #:** _____

Requisition #: _____ **Bid Open Date:** _____ (mm/dd/yyyy)

SECTION C: SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than _____ (Central Time) **on** _____ (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.285, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting entity. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting entity, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.282(19)(C).

(A working day is considered a normal business day of a governmental entity, not including weekends, federal or state holidays, or days the entity is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

3. Required Qualifications: ☐ - Not Applicable

4. Bonding/Insurance Requirements: ☐ - Not Applicable

5. Location to review plans/specifications: ☐ - Not Applicable

https://cdg.sharefile.com/d-sb774f0d73fc64c10b7b949be5299edbc

SECTION 005000 – WAGE RATES

PART 1 - GENERAL

1.1 Contractor is to comply with the minimum wage rates as indicated on Attachment “A”.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 005000

ATTACHMENT "A"

University Medical Center

Prevailing Wage Rates for Construction Projects

November 2020

Building Construction Trade Classification	Prevailing Wage Rate
Asbestos Worker	$14.50
Carpenter	$21.65
Carpet/Floor Installer	$16.46
Concrete Finisher	$18.85
Datacomm/Telecom	$15.50
Drywall Installer	$19.00
Ceiling Installer	$17.68
Electrician - Journeyman	$24.05
Electrician - Apprentice	$16.96
Elevator Mechanic	$34.88
Glazier	$17.00
Heavy Equipment Operator	$20.00
Piping/Ductwork Insulator	$17.00
Iron/Structural Worker	$23.00
Laborer	$14.00
Lather/Plasterer	$20.56
Light Equipment Operator	$18.80
Mason/Bricklayer	$23.95
Painter	$15.00
Plumber/Pipefitter Journeyman	$24.40
Plumber Apprentice	$15.00
Roofer	$16.00
Sheetmetal	$22.73
Sprinkler Fitter	$21.50
Terrazzo Worker	$20.00
Tile Setter	$16.00
Waterproofer	$15.72

Unlisted classifications needed for work not included within the scope of the classifications listed may not be added after award. The job classifications are not inclusive of all possible trades on a construction project.

It is the responsibility of the contractor to classify the worker in accordance with the published classifications and demonstrate that workers are paid commensurate with determined rates.

SECTION 007000 – GENERAL CONDITIONS

PART 1 - GENERAL

1.1 APPLICABLE DOCUMENT

A. AIA Document A201, 2017 ed. “General Conditions of the Contract for Construction” is a part of this project Manual. See attached document as part of this specification section.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 007000

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

University Medical Center
University Medical Center On-Call Room Renovations
602 Indiana Avenue
Lubbock, TX 79415

THE OWNER:
(Name, legal status and address)

Lubbock County Hospital District, d/b/a
University Medical Center

P.O. Box 5980
Lubbock, TX 79415

THE ARCHITECT:
(Name, legal status and address)

Condray Design Group, Inc.

3708 Upland Ave.
Lubbock, TX 79407

ADDITIONS AND DELETIONS:
The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™–2017, Guide for Supplementary Conditions.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

INDEX

(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, **12.3**
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3
Access to Work
3.16, 6.2.1, 12.1
Accident Prevention
10
Acts and Omissions
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2
Addenda
1.1.1
Additional Costs, Claims for
3.7.4, 3.7.5, 10.3.2, 15.1.5
Additional Inspections and Testing
9.4.2, 9.8.3, 12.2.1, **13.4**
Additional Time, Claims for
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**
Administration of the Contract
3.1.3, **4.2**, 9.4, 9.5
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.13
Allowances
3.8
Applications for Payment
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10
Approvals
2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1
Arbitration
8.3.1, 15.3.2, **15.4**
ARCHITECT
4
Architect, Definition of
4.1.1
Architect, Extent of Authority
2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2
Architect's Additional Services and Expenses
2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4
Architect's Administration of the Contract
3.1.3, 3.7.4, 15.2, 9.4.1, 9.5
Architect's Approvals
2.5, 3.1.3, 3.5, 3.10.2, 4.2.7
Architect's Authority to Reject Work
3.5, 4.2.6, 12.1.2, 12.2.1
Architect's Copyright
1.1.7, 1.5
Architect's Decisions
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2
Architect's Inspections
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4
Architect's Instructions
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2
Architect's Interpretations
4.2.11, 4.2.12
Architect's Project Representative
4.2.10
Architect's Relationship with Contractor
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2
Architect's Relationship with Subcontractors
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3
Architect's Representations
9.4.2, 9.5.1, 9.10.1
Architect's Site Visits
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Asbestos
10.3.1
Attorneys' Fees
3.18.1, 9.6.8, 9.10.2, 10.3.3
Award of Separate Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1
Binding Dispute Resolution
8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1
Bonds, Lien
7.3.4.4, 9.6.8, 9.10.2, 9.10.3
Bonds, Performance, and Payment
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**
Building Information Models Use and Reliance
1.8
Building Permit
3.7.1
Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5
Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4
Certificates of Inspection, Testing or Approval
13.4.4

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Certificates of Insurance
9.10.2
Change Orders
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5
Claims, Definition of
15.1.1
Claims, Notice of
1.6.2, 15.1.3
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**
Claims for Additional Time
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7
Claims Subject to Arbitration
15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**
Commencement of the Work, Definition of
8.1.2
Communications
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2
Compliance with Laws
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.4
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR SUSPENSION OF THE
5.4.1.1, 5.4.2, 11.5, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5, 15.2.5**
Contract Sum, Definition of
9.1
Contract Time
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, 6.1.2
Contractor's Construction and Submittal Schedules
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2
Contractor's Employees
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1
Contractor's Liability Insurance
11.1
Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Contractor's Relationship with Subcontractors
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4
Contractor's Relationship with the Architect
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
2.2.2, 9.7
Contractor's Right to Terminate the Contract
14.1
Contractor's Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.3.6, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.4
Costs
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7
Damages for Delay
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1
Delays and Extensions of Time
3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5
Digital Data Use and Transmission
1.7
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
1.1.9, 3.11

Effective Date of Insurance
8.2.2
Emergencies
10.4, 14.1.1.2, **15.1.5**
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1
Equipment, Labor, or Materials
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4
Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**
Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3
Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

GENERAL PROVISIONS
1
Governing Law
13.1
Guarantees (See Warranty)
Hazardous Materials and Substances
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1
Indemnification
3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3
Information and Services Required of the Owner
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
10.2.8, 10.4
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2
Instruments of Service, Definition of
1.1.7
Insurance
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**
Insurance, Notice of Cancellation or Expiration
11.1.4, 11.2.3
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 14.4.2
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, 11.2, 11.4, 11.5
Insurance, Stored Materials
9.3.2
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Insured loss, Adjustment and Settlement of
11.5
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13
Interest
13.5
Interpretation
1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 15.1.2, 15.4.1.1
Limitations of Liability
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1
Limitations of Time
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5
Materials, Hazardous
10.2.4, **10.3**
Materials, Labor, Equipment and
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Mediation
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1
Minor Changes in the Work
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.6.6, 9.9.3, **12.3**
Nonconforming Work, Rejection and Correction of

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2
Notice
1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1
Notice of Cancellation or Expiration of Insurance
11.1.4, 11.2.3
Notice of Claims
1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1
Notice of Testing and Inspections
13.4.1, 13.4.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.3.1, 9.6.6, 9.8
Orders, Written
1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Evidence of Financial Arrangements
2.2, 13.2.2, 14.1.1.4
Owner, Information and Services Required of the
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Owner's Authority
1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7
Owner's Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.5, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award Separate Contracts
6.1
Owner's Right to Stop the Work
2.4
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2, 14.4
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, 1.1.9, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3
Partial Occupancy or Use
9.6.6, **9.9**
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Permits, Fees, Notices and Compliance with Laws
2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.2**
Proposal Requirements
1.1.1
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Rejection of Work
4.2.6, 12.2.1
Releases and Waivers of Liens
9.3.1, 9.10.2
Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, **13.3**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Separate Contractors, Definition of
6.1.1
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Special Inspections and Testing
4.2.6, 12.2.1, 13.4
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14
Statute of Limitations
15.1.2, 15.4.1.1
Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3**
Substances, Hazardous
10.3
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 15.1.2
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
2.3.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4
Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1
Surety
5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7
Surety, Consent of
9.8.5, 9.10.2, 9.10.3
Surveys

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

1.1.7, 2.3.4
Suspension by the Owner for Convenience
14.3
Suspension of the Work
3.7.5, 5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.4.4
Termination by the Contractor
14.1, 15.1.7
Termination by the Owner for Cause
5.4.1.1, **14.2,** 15.1.7
Termination by the Owner for Convenience
14.4
Termination of the Architect
2.3.3
Termination of the Contractor Employment
14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5
Time Limits
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4
Time Limits on Claims
3.7.4, 10.2.8, 15.1.2, 15.1.3
Title to Work
9.3.2, 9.3.3

UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 9.1.2
Use of Documents
1.1.1, 1.5, 2.3.6, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.3.2
Waiver of Claims by the Contractor
9.10.5, 13.3.2, **15.1.7**
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**
Waiver of Consequential Damages
14.2.4, 15.1.7
Waiver of Liens
9.3, 9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, **11.3**
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2
Weather Delays
8.3, 15.1.6.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Orders
1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect and approved by the Owner. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.9 The Project Manual

The Project Manual is a volume assembled for the Project that may include the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.1.2 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

.1 Modifications.

.2 The Agreement.

.3 Addenda, with those of later date having precedence over those of earlier date.

.4 The Supplementary Conditions.

.5 The General Conditions of the Contract for Construction.

.6 Division 1 of the Specifications.

.7 Drawings and Divisions 2–49 of the Specifications.

.8 Other documents specifically enumerated in the Agreement as part of the Contract Documents.

In the case of conflicts or discrepancies between Drawings and Divisions 2–49 of the Specifications, or within or among the Contract Documents and not clarified by Addendum, the Architect will determine which takes precedence in accordance with Sections 4.2.11 and 4.2.12.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 The mention of certain items in the Specifications to the exclusion of others (whether in the general statement of the Work in a section or paragraph or in itemized lists of any nature); or the mention of work to be done in a specific area to the exclusion of similar or like work required in other areas; or the failure to properly cross-reference related work specified elsewhere, shall not relieve the Contractor of his responsibilities under the Contract Documents.

§ 1.2.5 The titles of sections and paragraphs are not necessarily fully descriptive of the work required thereby. The segregation of the various parts of the Work under headings, by trades, does not relieve the Contractor of the responsibility for furnishing every item shown on the drawings or specified in the specifications, or reasonably inferable therefrom as being necessary to produce the intended results, whether properly segregated or not.

§ 1.2.6 If an item is addressed differently in two places of the contract documents the greater quality or quantity applies and is assumed to take precedence.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 As between the Contractor and the Owner, the Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person,

by certified registered mail, or by courier providing proof of delivery.

§ 1.6.2 Intentionally omitted.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Intentionally omitted.

§ 2.2.2 Intentionally omitted.

§ 2.2.3 Intentionally omitted.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 2.2.4 Intentionally omitted.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 The Contractor will be furnished, free of charge, two .pdf file copies of Drawings and Project Manuals for execution of the Work. Additional copies may be purchased from the Architect at the cost of reproduction, postage and handling plus a reasonable mark-up.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Nevertheless, any errors, inconsistencies, or omissions discovered shall be reported to the Architect at once.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 The Contractor shall satisfy itself as to the accuracy of grades, elevations, dimensions, and locations. In cases of interconnection of Work with existing or other work, it shall verify at the site dimensions relating to such existing or other work.

§ 3.2.6 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, filed conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 To the extent that any portion of the Work requires a trench excavation exceeding five (5) feet in depth, in accordance with Texas Health and Safety Code Section 756.023(a), Contractor shall fully comply, and shall require any applicable Subcontractor to comply, with:

.1 The Occupational Safety and Health Administration standards for trench safety in effect for Construction of the Work;

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

.2 The special shoring requirements, if any, of the Owner; and

.3 Any geotechnical information obtained by Owner for use by the Contractor in the design of the trench safety system.

.4 Trench excavation safety protection shall be a separate pay item and shall be based on linear feet of trench excavated. Special shoring requirements shall also be a separate pay item and shall be based on the square feet of shoring used.

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect may consider requests for the substitution of products in place of those specified only under conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

.1 Represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 Represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

.3 Certifies that the cost data presented is complete and includes all related costs for the substituted product and of Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and

.4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be completed in all respects.

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Contractor shall not employ or subcontract with any persons (including, but not limited to, the project superintendent) or entity to which the Owner shall reasonably object.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

§ 3.6.1 The Owner qualifies for exemption from State and Local Sales Taxes pursuant to the provisions of the Texas Limited sales Excise and Use Tax Act.

§ 3.6.2 The Contractor performing the Contract may purchase, rent, or lease all materials, supplies, and equipment used or consumed in the performance of this Contract by issuing to his suppliers an exemption certificate in lieu of the tax, said exemption certificate complying with State Comptroller of Public Accounts Ruling No. 95-0.07. Any such exemption certificate issued by the Contractor in lieu of the tax shall be subject to the provision of the State Comptroller of Public Accounts Ruling No. 95-0.09 as amended to be effective October 2, 1968.

§ 3.6.3 The Owner is n exempt entity under the tax laws of the State of Texas. Texas Tax Code §151.309; 34 TAC §3.322. The Owner represents that this Project is eligible for exemption from the State Sales Tax on tangible personal property and material incorporated in the Project, provided that the Contractor fulfills the requirements of the Texas Tax Code §151.311 and 43 TAC §3.291; 3.287. For the purpose of establishing exemption, it is understood and agreed that the Contractor may be required to segregate materials and labor costs at the time a Contract is awarded. Contractor will accept a Certificate of Exemption from the Owner, pursuant to Texas Tax Code §151.054(e); §151.154; 34 TAC §3.285. Failure of Contractor or any Subcontractor to obtain Certificates of Resale from their suppliers shall make the Contractor or Subcontractor responsible for absorbing the tax, without compensation from Owner. Contractor shall pay all necessary local, county, and state taxes, income tax, compensation tax, social security, and withholding payments as required by law.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing, or where he reasonably should have known, it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 3.7.4 CONCEALED OR UNKNOWN CONDITIONS

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If Contractor disputes the Architect's reasons, he may proceed as provided in Article 15.

§ 3.7.4.1 The concealed or unknown conditions encountered below the surface of the ground shall apply to man-made conditions only. The materials to be excavated shall be considered as unclassified and the Contractor shall assume responsibility for excavating to the depths and limits required by the Contract Documents unless otherwise directed by the Architect, in which case the unit prices (if any) stated in the Contract Documents or subsequently agreed upon shall apply.

§ 3.7.4.2 Failure of the Drawings to show underground utility lines or other concealed piping, wiring, and the like shall not be construed as a guarantee on the part of the Architect or the Owner that such conditions do not exist. All operations involving excavation or removals shall be done at the risk of the Contractor who shall take the necessary precautions to protect employees and the public from injury or death and to avoid damage to existing systems.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made a reasonable objection. The superintendent cannot be changed during the course of the project without written approval from the Owner unless the superintendent leaves the employ of the Contractor, in which case Section 3.9.2 shall apply.

§ 3.9.4 The Contractor shall provide an experienced full-time superintendent on the project. The superintendent shall be on the job site from 8:00 AM to 4:00 PM each workday for the duration of the Project. The Contractor agrees to pay the Owner $200,00 per day, or portion of any day, that the superintendent is not on the job site, unless authorized in writing by the Owner. The Owner reserves the right to accept or reject the proposed superintendent based upon the individual's qualifications.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work and Project in full cooperation with any other contractors who may be on the Project. The Contractor's schedule shall indicate the critical path necessary for the Work to be successfully completed within the Contract Time.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Application for Payment, the Architect will review the amounts due to the Contractor and will consult with the Owner regarding such payments.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have a responsibility to inform the Owner of his recommendation to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 4.2.9 The Architect will conduct inspections to recommend to the Owner the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 Intentionally omitted.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

§ 4.2.14.1 Contractor's requests for information shall be prepared and submitted in accordance with Division 1 "General Requirements" sections on the form included in the Contract Documents, or, if not included, on AIA Document G716-2004. The Architect will return without action requests for information that do not conform to requirements of the Contract Documents.

§ 4.2.14.2 Where "as directed by Architect" or similar notation appears in the Contract Documents, the Contractor shall ask for and receive the necessary instructions from the Architect and Owner before proceeding with that portion of the Work. Requests for instructions shall be made with reasonable promptness.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.2.1 If required by the Owner, the Contractor shall submit evidence that the persons or entities he proposes to use are competent, have had experience and have performed satisfactorily on jobs of similar size, complexity, type, and scope. The information, if required, shall give complete experience records of the proposed person(s) or entit(ies), which records shall include: name of job(s), type(s) of job, General Contractor(s), Architect(s), date(s) completed, and approximate cost of subcontract(s).

§ 5.2.2.2 The acceptance of a person or entity (including those who are to furnish materials or equipment fabricated to a special design) shall not constitute approval of the materials they customarily handle, unless the materials are acceptable to the Architect as being equal to those specified in quality, function, performance, and appearance. The Architect shall render a judgment as to acceptability of the materials.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.5 Manufacturers and Fabricators

§ 5.2.5.1 Not later than fourteen (14) days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities proposed as manufacturers or fabricators for certain products, equipment, and systems

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

identified in the General Requirements (Division 1 of the Specifications) and, where applicable, the name of the installing Subcontractor. The Architect may reply within fourteen (14) days to the Contractor in writing stating 1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or 2) that the Architect requires additional time to review. Failure of the Owner or Architect to reply within the fourteen (14) day period shall constitute notice of no reasonable objection.

§ 5.2.5.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has not reasonable objection. If the proposed but rejected manufacturer or fabricator was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute manufacturer's or fabricator's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsibly in submitting names as requires.

§ 5.2.5.4 The Contractor shall not substitute a person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

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

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Intentionally omitted.

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect and the Owner of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect and Owner of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner and Contractor. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 The combined markup for overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, ten percent (10%) of the cost.

.2 For the Contractor, for Work performed by the Contractor's Subcontractors, five percent (5%) of the amount due the Subcontractors.

.3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, ten percent (10%) of the cost.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

.4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, five percent (5%) of the amount due the Sub-subcontractor.

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.

.6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also. In no case will a change be approved without such itemization.

§ 7.1.5 In cases where changes in the Work result in a credit to the Owner, the credit shall include direct costs for overhead, bonds, insurance, and profit. In cases where a change in the Work results in both credits and charges to the Owner, the Contractor will be allowed to add the overhead and profit percentages indicated in 7.1.4 to the net change.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

.1 The change in the Work;

.2 The amount of the adjustment, if any, in the Contract Sum; and

.3 The extent of the adjustment, if any, in the Contract Time. To permit evaluation, any request for a time extension must be justified and presented in adequate detail, showing the cause and how the proposed change will delay the final Substantial Completion date.

§ 7.2.2 In responding to a request for a proposed price for a change in the Work, or in submitting a claim, the Contractor shall furnish a lump sum proposal supported by a complete breakdown as described hereafter, indicating the estimated or actual cost of the Contractor for the performance of the changed Work, including the applicable percentage of overhead and profit described hereafter. Any request for a time extension must be justified and presented in adequate detail, showing that the proposed change will delay the final Contract Completion Date, to permit evaluation.

§ 7.2.2.1 The proposal for the adjustment of Work that a Subcontractor directly performs shall contain the following items:

.1 Estimated cost, using any discounts to the trades, for the materials and supplies used, which shall be itemized completely to include unit cost, quantity, and total cost.

.2 Estimated wages paid for skilled, semi-skilled, or unskilled labor performing the additional work, which shall be itemized completely to include trade(s), hourly rate, hours, and total cost. Such wages shall include labor required for performance of the changed Work only. Working foremen may be included; all other supervisors shall be excluded and shall be considered as a part of field supervision. Labor for supporting services, including but not limited to safety provisions, layout, and trash removal, shall be excluded and shall be considered a part of overhead.

.3 Estimated cost to the contractor for additional construction equipment used solely on the Change Order work, to include rental rates of owned equipment, rates for such items of equipment while in use, which shall be itemized completely to include types of equipment, number of each type of equipment, hourly rate, hours, and total cost. Equipment that is used regularly at the job shall be used in Change Order work at no extra charge. Rates for rental of owned equipment shall be no greater than those established by the AGC for the local area. As used herein the terms "construction equipment" and "equipment" shall include wheeled vehicles and small tools.

.4 Estimated transportation costs for delivery and handling of materials and supplies, bringing to and removing from the site additional construction equipment and/or new items of installed

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

equipment, if applicable, which shall be itemized separately.

.5 Estimated off-site storage costs in excess of thirty (30) calendar days for new items of installed equipment, if applicable.

.6 Percentage permitted to be added to total sum of .1, .2, .3, .4, and .5 above, to cover all field supervision (including superintendents), use of other tools and equipment already on the job as necessary for performance of the Change Order work, field and general home office services and expenses, interference with other work, adjustments to progress schedules and all other overhead (including bond and insurance, only if the Work is by Contract Amendment.

.7 To the total cost proposed for the Change Order work that is the sum of .1, .2, .3, .4, .5, and .6 above, and be added to the net cost of the following, if applicable, Social Security, Old Age pension and/or other taxes of like nature imposed upon the Subcontractor (or Contractor when Contractor performs the Work) by the State and Federal Government, or both, which are incident solely to such Change Order work and which the Contractor would be required to pay if or as it performs the Work.

§ 7.2.2.2 To the amount of the adjustment of Subcontractor proposal(s) as listed under paragraph 7.2.2.1 above, the Contractor will be allowed to add a percentage to cover all overhead expenses and profit, including supervision, small tools, insurance and bond. This percentage shall not exceed the combined allowable Subcontractor/Contractor percentage of ten percent (10%). It is expressly understood that when the Contractor performs the Work with its own forces there is no Subcontractor involved, the Contractor will be allowed a full maximum allowable markup of ten percent (10%).

§ 7.2.2.3 In cases where changes in the Work result in a credit to the Owner, the credit shall be limited to direct costs; that is, no overhead or profit shall be applied to such credit. In cases where a change in the Work results in both credits and charges to the Owner, the Contractor will be allowed to add the overhead and profit percentages in 7.2.2.1 and 7.2.2.2 to the net charge; if there is a net credit, no overhead or profit shall be charged.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

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

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and the Owner and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

§ 8.3.4 In the event of a delay in Contract Time, caused by the Owner, the Contractor will be reimbursed at a rate of $60.00 per hour for the time his superintendent is required to be on the

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

job site.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect and Owner. This schedule, unless objected to by the Architect or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect or Owner, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect and Owner an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents. The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G702TM-1992, Application and Certificate for Payment, supported by a current authorized edition of AIA Document G703TM-1992, Continuation Sheet.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Until Substantial Completion, the Owner will pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.2.1 In preparing the Application for Payment, the Contractor shall verify the accuracy of the requests for payment submitted by his Subcontractors and materials suppliers and shall not include in his Application for Payment any sum that, in his opinion, if approved, will result in an overpayment for their work performed or materials delivered.

§ 9.3.2.2 All items that are shipped in crates or otherwise wrapped shall be uncrated or unwrapped and inspected by the Contractor upon arrival at the site. Materials shall be carefully inspected for quantities, sizes, and color, if color selection is a consideration, damaged, or defects; and if damaged, defective, or otherwise not in conformance with the Contract Documents, shall be recorded immediately.

§ 9.3.2.3 The Contractor shall not request payment for any items until he has inspected the items, and any materials that are not in conformance with the Contract Documents shall not be included in any Application for Payment.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent agreed to by the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner or a Separate Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment for undisputed amounts, the Owner shall make payment in the manner and within the time provided in the Contract

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. The Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.3.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 In compliance with laws of the State of Texas, it is distinctly understood that by virtue of this Contract, no mechanic, Contractor, material man, artisan, or laborer, whether skilled or unskilled, shall in any manner have, claim, or acquire any lien upon the house, building, or any of the improvements of whatever nature or kind so erected or to be erected under this Contract or upon any so erected, built, or situated.

§ 9.10.2.2 Although the above Article clearly states that no entity may place a lien on this building or property, the Owner requires releases and waivers of liens as required in other portions of this Contract.

§ 9.10.2.3 As a prerequisite to final payment, the Contractor shall submit the following items to the Architect, properly executed:

.1 AIA Document G706 "Contractor's Affidavit of Payment of Debts and Claims".

.2 AIA Document G706A "Contractor's Affidavit of Release of Liens", conditional upon receipt of final payment

.3 AIA Document G707 "Consent of Surety Company to Final Payment", along with Contractor's release or waiver of lien (conditional upon receipt of final payment and separate releases or waivers of of liens from all Subcontractors and all material or equipment suppliers).

.4 Written guarantee by Contractor and each Subcontractor that the Work will be free of defects in materials and workmanship for a period of one year from date of Substantial Completion, except as otherwise specified.

.5 Maintenance Manuals as required in Specifications.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents;

.3 terms of special warranties required by the Contract Documents; or

.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 Time for Completion and Liquidated Damages

§ 9.11.1 It is hereby understood and mutually agreed, by and between the Contractor and Owner, that the date of the beginning and the time for completion of the Work are essential conditions of the Contract. The Contractor agrees that the Work will be prosecuted regularly and diligently at such rate of progress as will insure full completion thereof within the specified time as agreed upon and set forth in the Contract.

§ 9.11.2 If the Contractor shall neglect, fail, or refuse to complete the Work within the Contract Time specified, or any proper extension thereof granted by the Owner, then the Contractor and the Contractor's surety will be liable for and does hereby agree to pay to the Owner the sum of One Thousand Dollars and Zero Cents Dollars ($1,000.00), not as a penalty but as liquidated damages, for each and every calendar day that the Work remains incomplete after the time stipulated. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the extreme difficulty in fixing and ascertaining the actual damages the Owner would sustain in such an event and said amount is agreed to be the amount of damages that the Owner would sustain.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give Owner no less than fourteen (14) days' advance notice.

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 Additional Liquidated Damages

In the event of any incident negligent or intentional misconduct that creates the potential for or actually results in injury, Contractor agrees to pay, to the Owner, liquidated damages of $10,000 in addition to any other damages for which Contractor would be liable by law or under this contract.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact, due to Owner's negligence or intentional misconduct, the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity. The foregoing notwithstanding, Owner's obligation to indemnify shall apply only to the extent permitted by the Constitution and laws of the State of Texas, without waiving sovereign immunity, and not to exceed the limits provided by Texas Civil Practice & Remedies Code Chapters 101, 102, and 108.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred in instances other than those addressed in Subparagraph 10.3.5.

§ 10.4 Emergencies

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.5 Affidavit for Asbestos Exclusion and Notification

§ 10.5.1 Within Thirty (30) days of "Notice to Proceed," the Contractor will submit a notarized affidavit that states, "The undersigned Contractor certifies that to the best of his knowledge, information, and belief, the Work covered by the Contract Documents for his project will be completed without the use of any asbestos, asbestos related materials, fivers, or equipment and that the Architect and Owner will be immediately notified if the Contractor or any of his assigns or Subcontractors uncovers or has belief that asbestos products or materials are being used, installed, or uncovered at the jobsite."

§ 10.5.2 Upon completion of the Work, the Contractor will submit a notarized affidavit that states, "The undersigned Contractor certifies that to the best of his knowledge, information, and belief, the Work has been completed without the use of any asbestos related materials, fiber, or equipment." In addition, the Contractor shall prepare a ring binder with indexed dividers for each specification section. Behind each divider the Contractor shall insert the MSDS for each product utilized in the construction of the project that is associated with this section.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 Intentionally omitted.

§ 11.2.2 Intentionally omitted.

§ 11.2.3 Intentionally omitted.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Contractor shall pay the Architect its just share of insurance proceeds received by the Contractor, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner and shall require their Subcontractors to make payments to their Sub-subcontractors in similar manner.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 11.5.2 Prior to settlement of an insured loss, the Contractor shall notify the Owner of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Owner shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Owner does not object, the Contractor shall settle the loss and the Owner shall be bound by the settlement and allocation. Upon receipt, the Contractor shall deposit the insurance proceeds in a separate account and make the appropriate distribution. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Owner timely objects to either the terms of the proposed settlement of the allocation of the proceeds, the Contractor may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 Just prior to termination of the one year warranty period, the Contractor shall accompany the Owner and Architect on an inspection tour of the building and shall note defects and shall start remedying these defects within ten (10) days of the inspection tour. For extended warranties or guarantees required by various sections, e.g., roofing, compressors, mechanical equipment, the Owner will notify the Contractor of deficiencies and Contractor shall start remedying these defects within seven (7) days of initial notification from the Owner. Contractor shall prosecute the Work without interruption until accepted by the Owner and the Architect even though such prosecution should extend beyond the limits of the warranty period.

§ 12.2.2.5 Upon request by the Owner and prior to the expiration of one year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments and interest are due and payable in accordance with the Texas Prompt Pay Act, Texas Government Code Chapter 2251.

§ 13.7 Equal Opportunity in Employment

§ 13.7.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, sex (including pregnancy), national origin, age, physical or mental disability, genetic information, status as a protected veteran, or any other legally protected category, class, or characteristic. The Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the Contractor's nondiscrimination policies.

§ 13.7.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex (including pregnancy), national origin, age, physical or mental disability, genetic information, status as a protected veteran, or any other legally protected category, class, or characteristic.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; **or**

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 7 days after occurrence of the event giving rise to such Claim or within 7 days after the claimant first

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the critical path of construction as indicated on the Construction Schedule submitted and updated according to Section 3.10.1.

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work, and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.7 Waiver of Claims for Consequential Damages

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Owner's representative will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Intentionally omitted.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 15.4 Immunities; Attorneys' Fees

§ 15.4.1 Contractor stipulates that Owner is a political subdivision of the State of Texas, and, as such, enjoys immunities from suit and liability provided by the Constitution and laws of the State of Texas. By entering into this Agreement, Owner does not waive any of its immunities from suit and/or liability, except as otherwise specifically provided herein and as specifically authorized by law.

§ 15.4.1.1 Intentionally omitted.

§ 15.4.2 In any adjudication under this Agreement, reasonable and necessary attorneys' fees may be awarded to the prevailing party.

§ 15.4.3 Intentionally omitted.

§ 15.4.4 Consolidation or Joinder

Intentionally omitted.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Additions and Deletions Report for
AIA® Document A201® – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 10:49:53 CDT on 04/02/2025.

Changes to original AIA text

PAGE 1

University Medical Center

Lubbock County Hospital District, d/b/a

PAGE 5

1.1.9, 3.11

PAGE 7

1.1.1, 1.1.6, 1.1.7, 1.1.9, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3

PAGE 10

ARTICLE 1 GENERAL PROVISIONS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the ~~Architect.~~ Architect and approved by the Owner. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

PAGE 11

§ 1.1.9 The Project Manual

The Project Manual is a volume assembled for the Project that may include the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 1.2.1.2 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

.1 Modifications.

.2 The Agreement.

.3 Addenda, with those of later date having precedence over those of earlier date.

.4 The Supplementary Conditions.

.5 The General Conditions of the Contract for Construction.

.6 Division 1 of the Specifications.

.7 Drawings and Divisions 2–49 of the Specifications.

.8 Other documents specifically enumerated in the Agreement as part of the Contract Documents.

In the case of conflicts or discrepancies between Drawings and Divisions 2–49 of the Specifications, or within or among the Contract Documents and not clarified by Addendum, the Architect will determine which takes precedence in accordance with Sections 4.2.11 and 4.2.12.

PAGE 12

§ 1.2.4 The mention of certain items in the Specifications to the exclusion of others (whether in the general statement of the Work in a section or paragraph or in itemized lists of any nature); or the mention of work to be done in a specific area to the exclusion of similar or like work required in other areas; or the failure to properly cross-reference related work specified elsewhere, shall not relieve the Contractor of his responsibilities under the Contract Documents.

§ 1.2.5 The titles of sections and paragraphs are not necessarily fully descriptive of the work required thereby. The segregation of the various parts of the Work under headings, by trades, does not relieve the Contractor of the responsibility for furnishing every item shown on the drawings or specified in the specifications, or reasonably inferable therefrom as being necessary to produce the intended results, whether properly segregated or not.

§ 1.2.6 If an item is addressed differently in two places of the contract documents the greater quality or quantity applies and is assumed to take precedence.

§ 1.5.1 ~~The~~ As between the Contractor and the Owner, the Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

PAGE 13

§ 1.6.1 ~~Except as otherwise provided in Section 1.6.2, where~~ Where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, ~~by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the~~

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

~~Agreement.~~

~~§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed~~ by certified ~~or~~ registered mail, or by courier providing proof of delivery.

§ 1.6.2 Intentionally omitted.

The parties shall agree upon ~~written~~ protocols governing the transmission and use ~~of, and reliance on,~~ of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

Any use of, or reliance on, all or a portion of a building information model without agreement to ~~written~~ protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

~~§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~ Intentionally omitted.

~~§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.~~ Intentionally omitted.

~~§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~ Intentionally omitted.

~~§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.~~ Intentionally omitted.

~~§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.~~ The Contractor will be furnished, free of charge, two .pdf file copies of Drawings and Project Manuals for execution of the Work. Additional copies may be purchased from the Architect at the cost of reproduction, postage and handling plus a

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

reasonable mark-up.

PAGE 15

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Nevertheless, any errors, inconsistencies, or omissions discovered shall be reported to the Architect at once.

PAGE 16

§ 3.2.5 The Contractor shall satisfy itself as to the accuracy of grades, elevations, dimensions, and locations. In cases of interconnection of Work with existing or other work, it shall verify at the site dimensions relating to such existing or other work.

§ 3.2.6 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, filed conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3.4 To the extent that any portion of the Work requires a trench excavation exceeding five (5) feet in depth, in accordance with Texas Health and Safety Code Section 756.023(a), Contractor shall fully comply, and shall require any applicable Subcontractor to comply, with:

PAGE 17

.1 The Occupational Safety and Health Administration standards for trench safety in effect for Construction of the Work;

.2 The special shoring requirements, if any, of the Owner; and

.3 Any geotechnical information obtained by Owner for use by the Contractor in the design of the trench safety system.

.4 Trench excavation safety protection shall be a separate pay item and shall be based on linear feet of trench excavated. Special shoring requirements shall also be a separate pay item and shall be based on the square feet of shoring used.

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect may consider requests for the substitution of products in place of those specified only under conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

.1 Represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 Represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

.3 Certifies that the cost data presented is complete and includes all related costs for the substituted product and of Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and

.4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be completed in all respects.

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Contractor shall not employ or subcontract with any persons (including, but not limited to, the project superintendent) or entity to which the Owner shall reasonably object.

PAGE 18

§ 3.6.1 The Owner qualifies for exemption from State and Local Sales Taxes pursuant to the provisions of the Texas Limited sales Excise and Use Tax Act.

§ 3.6.2 The Contractor ~~shall pay sales, consumer, use~~ performing the Contract may purchase, rent, or lease all materials, supplies, and equipment used or consumed in the performance of this Contract by issuing to his suppliers an exemption certificate in lieu of the tax, said exemption certificate complying with State Comptroller of Public Accounts Ruling No. 95-0.07. Any such exemption certificate issued by the Contractor in lieu of the tax shall be subject to the provision of the State Comptroller of Public Accounts Ruling No. 95-0.09 as amended to be effective October 2, 1968.

~~and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.~~§ 3.6.3 The Owner is n exempt entity under the tax laws of the State of Texas. Texas Tax Code §151.309; 34 TAC §3.322. The Owner represents that this Project is eligible for exemption from the State Sales Tax on tangible personal property and material incorporated in the Project, provided that the Contractor fulfills the requirements of the Texas Tax Code §151.311 and 43 TAC §3.291; 3.287. For the purpose of establishing exemption, it is understood and agreed that the Contractor may be required to segregate materials and labor costs at the time a Contract is awarded. Contractor will accept a Certificate of Exemption from the Owner, pursuant to Texas Tax Code §151.054(e); §151.154; 34 TAC §3.285. Failure of Contractor or any Subcontractor to obtain Certificates of Resale from their suppliers shall make the Contractor or Subcontractor responsible for absorbing the tax, without compensation from Owner. Contractor shall pay all necessary local, county, and state taxes, income tax, compensation tax, social security, and withholding payments as required by law.

§ 3.7.3 If the Contractor performs Work ~~knowing~~ knowing, or where he reasonably should have known, it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

PAGE 19

§ 3.7.4 ~~Concealed or Unknown Conditions~~CONCEALED OR UNKNOWN CONDITIONS

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such ~~conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both.~~ conditions. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract ~~Documents and that no change in the terms of the Contract is justified.~~ Documents, the Architect shall promptly notify the Owner and ~~Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim~~ Contractor in writing, stating the reasons. If Contractor disputes the Architect's reasons, he may proceed as provided in Article 15.

§ 3.7.4.1 The concealed or unknown conditions encountered below the surface of the ground shall apply to man-made conditions only. The materials to be excavated shall be considered as unclassified and the Contractor shall assume responsibility for excavating to the depths and limits required by the Contract Documents unless otherwise directed by the Architect, in which case the unit prices (if any) stated in the Contract Documents or subsequently agreed upon shall apply.

§ 3.7.4.2 Failure of the Drawings to show underground utility lines or other concealed piping, wiring, and the like shall not be construed as a guarantee on the part of the Architect or the Owner that such conditions do not exist. All operations involving excavation or removals shall be done at the risk of the Contractor who shall take the necessary precautions to protect employees and the public from injury or death and to avoid damage to existing systems.

PAGE 20

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made a reasonable ~~and timely objection.~~ objection. The superintendent cannot be changed during the course of the project without written approval from the Owner unless the superintendent leaves the employ of the Contractor, in which case Section 3.9.2 shall apply.

~~The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.~~§ 3.9.4 The Contractor shall provide an experienced full-time superintendent on the project. The superintendent shall be on the job site from 8:00 AM to 4:00 PM each workday for the duration of the Project. The Contractor agrees to pay the Owner $200,00 per day, or portion of any day, that the superintendent is not on the job site, unless authorized in writing by the Owner. The Owner reserves the right to accept or reject the proposed superintendent based upon the individual's qualifications.

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work and Project in full cooperation with any other contractors who may be on the Project. The Contractor's schedule shall indicate the critical path necessary for the Work to be successfully completed within the Contract Time.

PAGE 22

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. ~~The Contractor shall be entitled to~~

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

~~rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents.~~ The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

PAGE 23

§ 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

PAGE 24

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the ~~Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.~~Owner.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

PAGE 25

~~The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project.~~ Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's ~~Applications~~ Application for Payment, the Architect will review ~~and certify~~ the amounts due to the Contractor and will ~~issue Certificates for Payment in such amounts.~~consult with the Owner regarding such payments.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have ~~authority~~ a responsibility to inform the Owner of his recommendation to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

PAGE 26

§ 4.2.9 The Architect will conduct inspections to ~~determine~~ recommend to the Owner the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Certificate for Payment pursuant to Section 9.10.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the ~~Owner or Contractor.~~ Owner. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.13 ~~The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.~~ Intentionally omitted.

§ 4.2.14.1 Contractor's requests for information shall be prepared and submitted in accordance with Division 1 "General Requirements" sections on the form included in the Contract Documents, or, if not included, on AIA Document G716-2004. The Architect will return without action requests for information that do not conform to requirements of the Contract Documents.

§ 4.2.14.2 Where "as directed by Architect" or similar notation appears in the Contract Documents, the Contractor shall ask for and receive the necessary instructions from the Architect and Owner before proceeding with that portion of the Work. Requests for instructions shall be made with reasonable promptness.

PAGE 27

§ 5.2.2.1 If required by the Owner, the Contractor shall submit evidence that the persons or entities he proposes to use are competent, have had experience and have performed satisfactorily on jobs of similar size, complexity, type, and scope. The information, if required, shall give complete experience records of the proposed person(s) or entit(ies), which records shall include: name of job(s), type(s) of job, General Contractor(s), Architect(s), date(s) completed, and approximate cost of subcontract(s).

§ 5.2.2.2 The acceptance of a person or entity (including those who are to furnish materials or equipment fabricated to a special design) shall not constitute approval of the materials they customarily handle, unless the materials are acceptable to the Architect as being equal to those specified in quality, function, performance, and appearance. The Architect shall render a judgment as to acceptability of the materials.

§ 5.2.5 Manufacturers and Fabricators

§ 5.2.5.1 Not later than fourteen (14) days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities proposed as manufacturers or fabricators for certain products, equipment, and systems identified in the General Requirements (Division 1 of the Specifications) and, where applicable, the name of the installing Subcontractor. The Architect may reply within fourteen (14) days to the Contractor in writing stating 1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or 2) that the Architect requires additional time to review. Failure of the Owner or Architect to reply within the fourteen (14) day period shall constitute notice of no reasonable objection.

PAGE 28

§ 5.2.5.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has not reasonable objection. If the proposed but rejected manufacturer or fabricator was reasonably capable of performing the Work, the Contract Sum and

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute manufacturer's or fabricator's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsibly in submitting names as requires.

§ 5.2.5.4 The Contractor shall not substitute a person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

PAGE 29

§ 6.1.4 ~~Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~Intentionally omitted.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect and the Owner of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect and Owner of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

PAGE 30

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the ~~Architect~~ Owner will allocate the cost among those responsible.

§ 7.1.2 A Change Order shall be based upon agreement among the ~~Owner, Contractor, and Architect.~~ Owner and Contractor. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.4 The combined markup for overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, ten percent (10%) of the cost.

.2 For the Contractor, for Work performed by the Contractor's Subcontractors, five percent (5%) of the amount due the Subcontractors.

.3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, ten percent (10%) of the cost.

.4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, five percent (5%) of the amount due the Sub-subcontractor.

PAGE 31

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

.6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also. In no case will a change be approved without such itemization.

§ 7.1.5 In cases where changes in the Work result in a credit to the Owner, the credit shall include direct costs for overhead, bonds, insurance, and profit. In cases where a change in the Work results in both credits and charges to the Owner, the Contractor will be allowed to add the overhead and profit percentages indicated in 7.1.4 to the net change.

.3 The extent of the adjustment, if any, in the Contract Time. To permit evaluation, any request for a time extension must be justified and presented in adequate detail, showing the cause and how the proposed change will delay the final Substantial Completion date.

§ 7.2.2 In responding to a request for a proposed price for a change in the Work, or in submitting a claim, the Contractor shall furnish a lump sum proposal supported by a complete breakdown as described hereafter, indicating the estimated or actual cost of the Contractor for the performance of the changed Work, including the applicable percentage of overhead and profit described hereafter. Any request for a time extension must be justified and presented in adequate detail, showing that the proposed change will delay the final Contract Completion Date, to permit evaluation.

§ 7.2.2.1 The proposal for the adjustment of Work that a Subcontractor directly performs shall contain the following items:

.1 Estimated cost, using any discounts to the trades, for the materials and supplies used, which shall be itemized completely to include unit cost, quantity, and total cost.

.2 Estimated wages paid for skilled, semi-skilled, or unskilled labor performing the additional work, which shall be itemized completely to include trade(s), hourly rate, hours, and total cost. Such wages shall include labor required for performance of the changed Work only. Working foremen may be included; all other supervisors shall be excluded and shall be considered as a part of field supervision. Labor for supporting services, including but not limited to safety provisions, layout, and trash removal, shall be excluded and shall be considered a part of overhead.

.3 Estimated cost to the contractor for additional construction equipment used solely on the Change Order work, to include rental rates of owned equipment, rates for such items of equipment while in use, which shall be itemized completely to include types of equipment, number of each type of equipment, hourly rate, hours, and total cost. Equipment that is used regularly at the job shall be used in Change Order work at no extra charge. Rates for rental of owned equipment shall be no greater than those established by the AGC for the local area. As used herein the terms "construction equipment" and "equipment" shall include wheeled vehicles and small tools.

.4 Estimated transportation costs for delivery and handling of materials and supplies, bringing to and removing from the site additional construction equipment and/or new items of installed equipment, if applicable, which shall be itemized separately.

.5 Estimated off-site storage costs in excess of thirty (30) calendar days for new items of installed equipment, if applicable.

.6 Percentage permitted to be added to total sum of .1, .2, .3, .4, and .5 above, to cover all field supervision (including superintendents), use of other tools and equipment already on the job as necessary for performance of the Change Order work, field and general home office services and expenses, interference with other work, adjustments to progress schedules and all other overhead (including bond and insurance, only if the Work is by Contract Amendment.

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

.7 To the total cost proposed for the Change Order work that is the sum of .1, .2, .3, .4, .5, and .6 above, and be added to the net cost of the following, if applicable, Social Security, Old Age pension and/or other taxes of like nature imposed upon the Subcontractor (or Contractor when Contractor performs the Work) by the State and Federal Government, or both, which are incident solely to such Change Order work and which the Contractor would be required to pay if or as it performs the Work.

§ 7.2.2.2 To the amount of the adjustment of Subcontractor proposal(s) as listed under paragraph 7.2.2.1 above, the Contractor will be allowed to add a percentage to cover all overhead expenses and profit, including supervision, small tools, insurance and bond. This percentage shall not exceed the combined allowable Subcontractor/Contractor percentage of ten percent (10%). It is expressly understood that when the Contractor performs the Work with its own forces there is no Subcontractor involved, the Contractor will be allowed a full maximum allowable markup of ten percent (10%).

§ 7.2.2.3 In cases where changes in the Work result in a credit to the Owner, the credit shall be limited to direct costs; that is, no overhead or profit shall be applied to such credit. In cases where a change in the Work results in both credits and charges to the Owner, the Contractor will be allowed to add the overhead and profit percentages in 7.2.2.1 and 7.2.2.2 to the net charge; if there is a net credit, no overhead or profit shall be charged.

PAGE 33

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and the Owner and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

PAGE 34

§ 8.3.4 In the event of a delay in Contract Time, caused by the Owner, the Contractor will be reimbursed at a rate of $60.00 per hour for the time his superintendent is required to be on the job site.

PAGE 35

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the ~~Architect.~~ Architect and Owner. This schedule, unless objected to by the ~~Architect,~~ Architect or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the ~~Architect,~~ Architect or Owner, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect and Owner an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents. The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G702TM-1992, Application and Certificate for Payment, supported by a current authorized edition of AIA Document G703TM-1992, Continuation Sheet.

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 9.3.1.3 Until Substantial Completion, the Owner will pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments.

PAGE 36

§ 9.3.2.1 In preparing the Application for Payment, the Contractor shall verify the accuracy of the requests for payment submitted by his Subcontractors and materials suppliers and shall not include in his Application for Payment any sum that, in his opinion, if approved, will result in an overpayment for their work performed or materials delivered.

§ 9.3.2.2 All items that are shipped in crates or otherwise wrapped shall be uncrated or unwrapped and inspected by the Contractor upon arrival at the site. Materials shall be carefully inspected for quantities, sizes, and color, if color selection is a consideration, damaged, or defects; and if damaged, defective, or otherwise not in conformance with the Contract Documents, shall be recorded immediately.

§ 9.3.2.3 The Contractor shall not request payment for any items until he has inspected the items, and any materials that are not in conformance with the Contract Documents shall not be included in any Application for Payment.

PAGE 37

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent ~~reasonably necessary to protect~~ agreed to by the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary ~~in the Architect's opinion~~ to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

§ 9.6.1 After the Architect has issued a Certificate for ~~Payment,~~ Payment for undisputed amounts, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

PAGE 38

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. ~~If approved by the applicable court, when required, the~~ The Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

PAGE 39

§ 9.8.3.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and ~~Contractor or, if no agreement is reached, by decision of the Architect.~~Contractor.

PAGE 40

§ 9.10.1.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in ~~effect,~~ effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

PAGE 41

§ 9.10.2.1 In compliance with laws of the State of Texas, it is distinctly understood that by virtue of this Contract, no mechanic, Contractor, material man, artisan, or laborer, whether skilled or unskilled, shall in any manner have, claim, or acquire any lien upon the house, building, or any of the improvements of whatever nature or kind so erected or to be erected under this Contract or upon any so erected, built, or situated.

§ 9.10.2.2 Although the above Article clearly states that no entity may place a lien on this building or property, the Owner requires releases and waivers of liens as required in other portions of this Contract.

§ 9.10.2.3 As a prerequisite to final payment, the Contractor shall submit the following items to the Architect, properly executed:

.1 AIA Document G706 "Contractor's Affidavit of Payment of Debts and Claims".

.2 AIA Document G706A "Contractor's Affidavit of Release of Liens", conditional upon receipt of final payment

.3 AIA Document G707 "Consent of Surety Company to Final Payment", along with Contractor's release or waiver of lien (conditional upon receipt of final payment and separate releases or waivers of of liens from all Subcontractors

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

and all material or equipment suppliers).

.4 Written guarantee by Contractor and each Subcontractor that the Work will be free of defects in materials and workmanship for a period of one year from date of Substantial Completion, except as otherwise specified.

.5 Maintenance Manuals as required in Specifications.

PAGE 42

§ 9.11 Time for Completion and Liquidated Damages

§ 9.11.1 It is hereby understood and mutually agreed, by and between the Contractor and Owner, that the date of the beginning and the time for completion of the Work are essential conditions of the Contract. The Contractor agrees that the Work will be prosecuted regularly and diligently at such rate of progress as will insure full completion thereof within the specified time as agreed upon and set forth in the Contract.

§ 9.11.2 If the Contractor shall neglect, fail, or refuse to complete the Work within the Contract Time specified, or any proper extension thereof granted by the Owner, then the Contractor and the Contractor's surety will be liable for and does hereby agree to pay to the Owner the sum of One Thousand Dollars and Zero Cents Dollars ($1,000.00), not as a penalty but as liquidated damages, for each and every calendar day that the Work remains incomplete after the time stipulated. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the extreme difficulty in fixing and ascertaining the actual damages the Owner would sustain in such an event and said amount is agreed to be the amount of damages that the Owner would sustain.

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give Owner no less than fourteen (14) days' advance notice.

PAGE 43

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.2.9 Additional Liquidated Damages

In the event of any incident negligent or intentional misconduct that creates the potential for or actually results in injury, Contractor agrees to pay, to the Owner, liquidated damages of $10,000 in addition to any other damages for which Contractor would be liable by law or under this contract.

PAGE 44

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in ~~fact~~ fact, due to Owner's negligence or intentional misconduct, the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity. The foregoing notwithstanding, Owner's obligation to indemnify shall apply only to the extent permitted by the Constitution and laws of the State of Texas, without waiving sovereign immunity, and not to exceed the limits provided by Texas

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Civil Practice & Remedies Code Chapters 101, 102, and 108.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby ~~incurred.~~incurred in instances other than those addressed in Subparagraph 10.3.5.

PAGE 45

§ 10.5 Affidavit for Asbestos Exclusion and Notification

§ 10.5.1 Within Thirty (30) days of "Notice to Proceed," the Contractor will submit a notarized affidavit that states, "The undersigned Contractor certifies that to the best of his knowledge, information, and belief, the Work covered by the Contract Documents for his project will be completed without the use of any asbestos, asbestos related materials, fivers, or equipment and that the Architect and Owner will be immediately notified if the Contractor or any of his assigns or Subcontractors uncovers or has belief that asbestos products or materials are being used, installed, or uncovered at the jobsite."

§ 10.5.2 Upon completion of the Work, the Contractor will submit a notarized affidavit that states, "The undersigned Contractor certifies that to the best of his knowledge, information, and belief, the Work has been completed without the use of any asbestos related materials, fiber, or equipment." In addition, the Contractor shall prepare a ring binder with indexed dividers for each specification section. Behind each divider the Contractor shall insert the MSDS for each product utilized in the construction of the project that is associated with this section.

§ 11.2.1 ~~The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.~~Intentionally omitted.

PAGE 46

§ 11.2.2 ~~**Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~Intentionally omitted.

§ 11.2.3 ~~**Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required~~

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

~~insurance.~~Intentionally omitted.

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the ~~Owner~~ Contractor as fiduciary and made payable to the ~~Owner~~ Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The ~~Owner~~ Contractor shall pay the Architect ~~and Contractor their just shares~~ its just share of insurance proceeds received by the ~~Owner,~~ Contractor, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner and shall require their Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the ~~Owner shall notify the Contractor~~ Contractor shall notify the Owner of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The ~~Contractor~~ Owner shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the ~~Contractor~~ Owner does not object, the ~~Owner~~ Contractor shall settle the loss and the ~~Contractor~~ Owner shall be bound by the settlement and allocation. Upon receipt, the ~~Owner~~ Contractor shall deposit the insurance proceeds in a separate account and make the appropriate ~~distributions.~~ distribution. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the ~~Contractor~~ Owner timely objects to either the terms of the proposed settlement ~~or~~ of the allocation of the proceeds, the ~~Owner~~ Contractor may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

PAGE 48

§ 12.2.2.4 Just prior to termination of the one year warranty period, the Contractor shall accompany the Owner and Architect on an inspection tour of the building and shall note defects and shall start remedying these defects within ten (10) days of the inspection tour. For extended warranties or guarantees required by various sections, e.g., roofing, compressors, mechanical equipment, the Owner will notify the Contractor of deficiencies and Contractor shall start remedying these defects within seven (7) days of initial notification from the Owner. Contractor shall prosecute the Work without interruption until accepted by the Owner and the Architect even though such prosecution should extend beyond the limits of the warranty period.

§ 12.2.2.5 Upon request by the Owner and prior to the expiration of one year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

PAGE 50

Payments ~~due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate~~ and interest are due and payable in accordance with the Texas Prompt Pay Act, Texas Government Code Chapter 2251.

§ 13.7 Equal Opportunity in Employment

~~the parties agree upon in writing or, in the absence thereof, at~~ § 13.7.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, sex (including pregnancy), national origin, age, physical or mental disability, genetic information, status as a protected veteran, or any other legally protected category, class, or characteristic. The Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the Contractor's nondiscrimination policies.

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

~~the legal rate prevailing from time to time at the place where the Project is located.~~§ 13.7.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex (including pregnancy), national origin, age, physical or mental disability, genetic information, status as a protected veteran, or any other legally protected category, class, or characteristic.

or

~~.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~

PAGE 52

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within ~~21~~ 7 days after occurrence of the event giving rise to such Claim or within ~~21~~ 7 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

PAGE 53

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the ~~scheduled construction.~~critical path of construction as indicated on the Construction Schedule submitted and updated according to Section 3.10.1.

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work, and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

PAGE 54

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The ~~Architect~~ Owner's representative will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

PAGE 55

§ 15.3.3 ~~Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the~~

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

~~demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.~~Intentionally omitted.

PAGE 56

§ 15.4 ~~Arbitration~~Immunities; Attorneys' Fees

§ 15.4.1 ~~If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~Contractor stipulates that Owner is a political subdivision of the State of Texas, and, as such, enjoys immunities from suit and liability provided by the Constitution and laws of the State of Texas. By entering into this Agreement, Owner does not waive any of its immunities from suit and/or liability, except as otherwise specifically provided herein and as specifically authorized by law.

§ 15.4.1.1 ~~A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~Intentionally omitted.

§ 15.4.2 ~~The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~In any adjudication under this Agreement, reasonable and necessary attorneys' fees may be awarded to the prevailing party.

§ 15.4.3 ~~The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~Intentionally omitted.

~~**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

~~**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

~~**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

Intentionally omitted.

Variable Information

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

PAGE 1

University Medical Center On-Call Room Renovations

602 Indiana Avenue
Lubbock, TX 79415

University Medical Center

P.O. Box 5980
Lubbock, TX 79415

Condray Design Group, Inc.

3708 Upland Ave.
Lubbock, TX 79407

Additions and Deletions Report for AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Subscription No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Stacey Mincey Wittry, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:49:53 CDT on 04/02/2025 under Order No. 20240070353 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ - 2017, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

ARCHITECT

(Title)

4.2.2025

(Dated)

AIA Document D401 – 2003. Copyright © 1992 and 2003. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:49:53 CDT on 04/02/2025 under Order No.20240070353 which expires on 10/15/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (67ed5c0ff55a9756b5289580)

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Owner-furnished products.
6. Access to site.
7. Coordination with occupants.
8. Work restrictions.
9. Specification and drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: **UMC Pharmacy & On-Call Room Renovations.**

1. Project Location: 602 Indiana Avenue, Lubbock, Texas 79415.

B. Owner: **University Medical Center Health System**

1. Owner's Representative: **Zach Sawyer, University Medical Center**

C. Architect: **Condray Design Group**

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Mechanical, Plumbing and Electrical Engineering: Justin Fincher, Fincher Engineering, LLC, 5621 114th Street, Suite 100, Lubbock, Texas 79424, (806) 701-5109.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Project Scope of Work includes **Proposal Item #1** – Renovation of the Central Pharmacy and relocation of associated offices at the basement level of the main hospital (6,056 SF), **Proposal Item #2** – Renovation of the OR Pharmacy (680 SF) on the first level of the main hospital and **Proposal Item #3** – Renovation of 20 On-Call Rooms (8,641 SF) including ancillary supports spaces located on the basement level of the main hospital.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION

A. The Work shall be conducted in **6 phases**, refer to drawing sheets for identification.

B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates, and move-out and -in dates of Owner's personnel, for all phases of the Work.

1.6 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. Asbestos abatement.
2. Clean Hood Room Renovation in Central Pharmacy.

C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. Vendor coordination or equipment installation, (i.e. pneumatic tube system).

1.7 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections unless otherwise noted.

1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.

7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.
11. Contractor shall install and otherwise incorporate Owner-furnished items into the Work.

B. Owner-Furnished Products:

1. Paper towel holders.
2. Soap dispensers.
3. Toilet paper dispensers.

1.8 ACCESS TO SITE

A. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways, parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.9 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than **72 hours** in advance of activities that will affect Owner's operations.

1.10 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated. **A need for after hours or weekend work might be required to accommodate the Owner's continued use of this critical space at no additional cost to the Owner.**

1. Weekend Hours: Coordinate in advance with Owner.
2. Early Morning Hours: Coordinate in advance with Owner.
3. Hours for Utility Shutdowns: Coordinate in advance with Owner.
4. Hours for Core Drilling and noisy activity: Coordinate in advance with Owner.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify **Owner** not less than **five working days** in advance of proposed utility interruptions.
2. Obtain **Owner's** written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify **Owner** not less than **five working days** in advance of proposed disruptive operations.
2. Obtain **Owner's** written permission before proceeding with disruptive operations.

E. Nonsmoking Facilities: Smoking is not permitted **anywhere on the Campus.**

F. Controlled Substances: Use of tobacco products and other controlled substances **anywhere on the Campus** is prohibited.

G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products may be identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products may be identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use a standard form that includes all information required by this Section.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. 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 proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect,

sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution 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.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    b. Requested substitution provides sustainable design characteristics that specified product provided.
    c. Substitution request is fully documented and properly submitted.
    d. Requested substitution will not adversely affect Contractor's construction schedule.
    e. Requested substitution has received necessary approvals of authorities having jurisdiction.
    f. Requested substitution is compatible with other portions of the Work.
    g. Requested substitution has been coordinated with other portions of the Work.
    h. Requested substitution provides specified warranty.
    i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    b. Requested substitution does not require extensive revisions to the Contract Documents.
    c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    d. Requested substitution provides sustainable design characteristics that specified product provided.
    e. Substitution request is fully documented and properly submitted.
    f. Requested substitution will not adversely affect Contractor's construction schedule.
    g. Requested substitution has received necessary approvals of authorities having jurisdiction.
    h. Requested substitution is compatible with other portions of the Work.
    i. Requested substitution has been coordinated with other portions of the Work.
    j. Requested substitution provides specified warranty.
    k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's standard Supplemental Instruction form.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within (7) days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change. **If additional time is needed, on or before the seventh day, submit a list of affected sub-contractors with a schedule of anticipated date(s) that the pricing will be completed.**

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    e. Quotation Form: Use "UMC Change Request Price Breakdown Sheet." A copy is attached at the end of this section.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 “Substitution Procedures” if the proposed change requires substitution of one product or system for product or system specified.
7. **Proposal Request Form:** ***UMC Change Request Price Breakdown Sheet.*** **A copy is attached at the end of this section.**

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

UNIVERSITY MEDICAL CENTER- CHANGE REQUEST PRICE BREAKDOWN SHEET

(STANDARD FORM TO BE FILLED OUT BY SUBTRACTOR FOR ALL CHANGE REQUESTS)

UMC PROJECT NAME: DATE:
PROJECT CCR NUMBER:

SUB CONTRACTOR: ELECTRICAL SUB CONTRACTOR

NAME OF PERSON WHO PREPARED THE ESTIMATE FOR THE WORK: JOHN DOE SR.

CONTACT NUMBER: 806-555-5555

	MATERIAL				LABOR				
Item	Quantity	Unit	UNIT COST	SUBTOTAL	MAN HOURS	HOURLY RATE	LABOR BURDEN	SUB TOTAL LABOR	Total
Description									
				$ -				$ -	$ -
				$ -				$ -	$ -
				$ -				$ -	$ -
SUBTOTAL (LABOR AND MATERIAL)									$ -
ADDITONAL EQUIPMENT									
SUBTOTAL (LABOR, MATERIAL AND EQUIPMENT)									$ -
OVERHEAD/PROFIT FOR LABOR/MATERIAL/EQUIPMENT (10% MAX FOR ALL FIRST TIER SUB)								10%	$ -
SUBTOTAL WITH OH&P									$ -
ADDITIONAL WORK FROM 2ND TIER SUB (5% MAX FOR ALL SECOND TIER SUBS)									
*ATTACH SUB TIER PRICE BREAKOUT AS SUPPORTING DOCUMENTATION								5%	$ -
SECOND TIER SUBTOTAL WITH OH&P									$ -
								TOTAL	$ -

ALL MATERIAL COSTS NEED TO IDENTIFIED AND ATTACHED TO THIS PRICE PROPOSAL BREAKDOWN

SPECIAL CONDITIONS THAT MAY IMPACT COST:

GENERAL CONTRACTOR:

GENERAL CONTRACTOR PROJECT MANAGER:

SIGNATURE OF PROJECT MANAGER **SIGNATURE OF SUB CONTRACTOR:**

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

    a. Application for Payment forms with continuation sheets.
    b. Submittal schedule.
    c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date, but no later than twenty-one (21) days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract as described in Section 011000 "Summary."

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

      1) Labor.
      2) Materials.
      3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Submit Application for Payment to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

1. Submit draft copy of Application for Payment seven (7) days prior to due date for review by Architect.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: **With prior approval by the Owner include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site. For materials that are allowed to be stored off-site, abide by the following conditions unless otherwise agreed to in writing by the Owner.**

1. Store materials in a Bonded Commercial Warehouse
2. Provide separate Insurance Coverage adequate not only to cover materials while in storage, but also in transit from the off-site storage areas to the project site. Copies of duly authenticated Certificates of Insurance, made out to insure the Owner which is signatory to the contract, must be filed with the Owner's representative and submitted with Application for Payment.
3. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
4. Inspection by Owner's representative is allowed at any time. The Owner's Inspectors must be satisfied with the security, control, maintenance, and preservation measures.
5. Materials for this project are physically separated and marked for the project in a sectioned-off area. Only materials which have been approved through the submittal process are to be considered for payment.

6. Owner reserves the right to reject materials at any time prior to final acceptance of the complete Contract if they do not meet Contract requirements regardless of any previous progress payment made.

7. With each monthly payment estimate, submit a report to the Architect listing the quantities of materials already paid for and still stored in the off-site location.

8. Make warehouse records, receipts and invoices available to Owner's representatives, upon request, to verify the quantities and their disposition.

9. In the event of Contract termination or default by Contractor, the items in storage off-site, upon which payment has been made, will be promptly turned over to Owner or Owner's agents at a location near the jobsite as directed by the Owner. The full provisions of Performance and Payment Bonds on this project cover the materials off-site in every respect as though they were stored on the Project Site.

10. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.

b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit a legible digital or scanned copy of each Application for Payment to Architect by a method ensuring receipt within 24 hours. Ensure that the document is notarized as required. Include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

2. Submit a current Construction Progress Schedule along with each Application for Payment. Failure to include this with the Application for Payment may result in a delay of the review/ certification process.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Schedule of unit prices.
6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. Copies of building permits.

9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Report of preconstruction conference.
11. Certificates of insurance and insurance policies.
12. Performance and payment bonds.
13. Initial Construction Schedule

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

AIA® Document G706™ – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
		ARCHITECT: ☐
	CONTRACT FOR:	CONTRACTOR: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐
		OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☐ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

AIA Document G706™ – 1994. Copyright © 1970 and 1994 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 16:38:56 CT on 03/25/2021 under Order No.3392597450 which expires on 10/14/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes: (3B9ADA6C)

AIA® Document G706A™ – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
		ARCHITECT: ☐
	CONTRACT FOR:	
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	CONTRACTOR: ☐
		SURETY: ☐
		OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

AIA Document G706A™ – 1994. Copyright © 1982 and 1994 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 16:40:16 CT on 03/25/2021 under Order No.3392597450 which expires on 10/14/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes: (3B9ADA72)

AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
	CONTRACT FOR:	ARCHITECT: ☐
		CONTRACTOR: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐
		OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(*Insert name and address of Surety*)

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

_____
(Surety)

_____
(Signature of authorized representative)

Attest:
(Seal):

_____
(Printed name and title)

AIA Document G707™ – 1994. Copyright © 1982 and 1994 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 16:37:14 CT on 03/25/2021 under Order No.3392597450 which expires on 10/14/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes: (3B9ADA66)

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. Requests for Information (RFIs).
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home,

office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    f. Indicate required installation sequences.
    g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Preparation Format: DWG, latest version , operating in Microsoft Windows operating system.
3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

    a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    b. Digital Data Software Program: Drawings are available in AutoCAD 2018 .dwg format.
    c. Contractor shall execute a data licensing agreement in the form of Agreement form made available upon request to the Architect.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.

13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing and long-lead items.
d. Designation of key personnel and their duties.
e. Lines of communications.
f. Procedures for processing field decisions and Change Orders.
g. Procedures for RFIs.
h. Procedures for testing and inspecting.
i. Procedures for processing Applications for Payment.
j. Distribution of the Contract Documents.
k. Submittal procedures.
l. Sustainable design requirements when applicable.
m. Preparation of record documents.
n. Use of the premises and existing building when applicable.
o. Work restrictions.
p. Working hours.
q. Owner's occupancy requirements.
r. Responsibility for temporary facilities and controls.
s. Procedures for moisture and mold control.
t. Procedures for disruptions and shutdowns.
u. Construction waste management and recycling.
v. Parking availability.
w. Office, work, and storage areas.
x. Equipment deliveries and priorities.
y. Security.
z. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Sustainable design requirements where applicable.
    i. Review of mockups.
    j. Possible conflicts.
    k. Compatibility requirements.
    l. Time schedules.
    m. Weather limitations.
    n. Manufacturer's written instructions.
    o. Warranty requirements.
    p. Compatibility of materials.
    q. Acceptability of substrates.
    r. Temporary facilities and controls.
    s. Space and access limitations.
    t. Regulations of authorities having jurisdiction.
    u. Testing and inspecting requirements.
    v. Installation procedures.
    w. Coordination with other work.
    x. Required performance results.
    y. Protection of adjacent work.
    z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.

c. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for delivery of material samples, attic stock, and spare parts.
f. Requirements for demonstration and training.
g. Preparation of Contractor's punch list.
h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Submittal procedures.
j. Owner's partial occupancy requirements.
k. Installation of Owner's furniture, fixtures, and equipment.
l. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at regularly schedule intervals as agreed upon at Preconstruction Meeting but not less frequently than biweekly.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Daily construction reports.
3. Site condition reports.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting schedules and reports.
2. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

D. Daily Construction Reports: **Submit at weekly intervals**.

E. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:

    a. Use of premises restrictions.

4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Submittals.
    b. Purchases.
    c. Mockups.

d. Fabrication.
e. Deliveries.
f. Installation.
g. Tests and inspections.
h. Curing.
i. Startup and placement into final use and operation.

5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Structural completion.
b. Temporary enclosure and space conditioning.
c. Permanent space enclosure.
d. Completion of mechanical installation.
e. Completion of electrical installation.
f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

1. Temporary enclosure and space conditioning.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for commencement of the Work. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. Material deliveries.
4. High and low temperatures and general weather conditions, including presence of rain or snow.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (see special reports).
8. Stoppages, delays, shortages, and losses.
9. Emergency procedures.
10. Orders and requests of authorities having jurisdiction.
11. Change Orders received and implemented.
12. Construction Change Directives received and implemented.
13. Services connected and disconnected.
14. Equipment or system tests and startups.
15. Partial completions and occupancies.
16. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule along with Meeting Notes at each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Preconstruction video recordings.
3. Construction progress photographs.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting photographic documentation.
2. Section 017700 "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
3. Section 024119 “Selective Demolition” for submitting photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs:

1. Digital Camera: Minimum sensor resolution of 8 megapixels.
2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph.
3. File Type: Submit .jpeg image files.

C. Video Recordings:

1. Submit video recordings in digital video file format acceptable to Architect.
2. Identification: With each submittal, provide the following information:

a. Name of Project.
b. Date video recording was recorded.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 PRECONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of preconstruction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.

C. Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Where applicable, take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Where applicable, take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
5. **Submit these photos to the Architect/ Owner prior to commencement of any Work.**

3.2 PRECONSTRUCTION VIDEO RECORDINGS

A. As an alternate to Preconstruction Photographs, the Contractor may elect, with the permission of the Owner, to instead provide Preconstruction video recordings as follows.

B. Recording: Mount camera on tripod before starting recording unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.

C. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.

1. Confirm date and time at beginning and end of recording.
2. Begin each video recording with name of Project, Contractor's name, videographer's name, and Project location.

D. Preconstruction Video Recording: Before starting demolition, record video recording of Project site and surrounding properties from different vantage points, as directed by Architect.

1. Flag construction limits before recording construction video recordings.
2. Show existing conditions adjacent to Project site before starting the Work.
3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of demolition where applicable or new construction.

4. Show protection efforts by Contractor.
5. **Submit video recordings to the Architect/ Owner prior to commencement of any Work.**

3.3 CONSTRUCTION PROGRESS PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. File Type: Submit .jpeg image files

C. Construction Progress Photographs: During Construction, take photographs of elements as they are completed as well as overall photographs of the jobsite.

1. Prior to concealing any constructed items behind, above, or beneath any other fixed material take photographs evidencing the materials and workmanship of construction to be covered or concealed.

2. **Upload and submit daily photographs to an FTP site or other approved means of web-based file storage that the Architect and Owner can freely access, at a minimum, each week.**

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to

submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals only to the extent stated below.

1. Architect will furnish (1) one single layer background screen of the architectural floor plan and/or reflected ceiling plan in electronic format.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2018 format (.dwg).
    c. Contractor shall execute a data licensing agreement in the form of Agreement form provide upon request to the Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is required, allow 21 days for initial review of each submittal. These include, but are not limited to the following Sections

a. Structural
b. Mechanical
c. Plumbing
d. Electrical

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use sequential submittal number, Specification Section number, followed by an "R" and revision number, and then the Section Name.
Example: 01-123456-R0 Spec Section/Submittal Name
b. Resubmittals shall have a new sequential suffix number.
Example: 01-123456-R1 Spec Section/Submittal Name

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Contractor.
e. Name of firm or entity that prepared submittal.
f. Names of subcontractor, manufacturer, and supplier.
g. Category and type of submittal.
h. Submittal purpose and description.
i. Specification Section number and title.
j. Specification paragraph number or drawing designation and generic name for each of multiple items.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Related physical samples submitted directly.
n. Indication of full or partial submittal.

o. Transmittal number, numbered consecutively.
p. Submittal and transmittal distribution record.
q. Other necessary identification.
r. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. If file size is too large to send via email (over 10 MB), post electronic submittals as PDF electronic files directly to Architect's FTP site specifically established for Project and notify Architect by email when files have been posted.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. **Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.**

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.
    e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

a. PDF electronic file.

F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.
2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data : For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.

3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

K. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made directly by the Owner.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Refer to Infection Control Risk Assessment (ICRA) attached to the end of this section.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: When project is located within the hospital, electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. For projects located outside of the hospital, the General Contractor is to establish temporary electrical service with the utility company with a meter and pay all charges incurred.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.

2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste handling procedures.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the Texas Accessibility Standards.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

B. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack and marker boards.
3. Drinking water and private toilet.
4. Coffee machine and supplies.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

   a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
   b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. **Temporary partitions will be required to separate existing spaces from all areas of Work**. **These are the responsibility of the Contractor and the exact location and extent must be coordinated with the Owner. Refer to additional information in this Section about construction of Temporary Partitions.** Maintain dust partitions during the Work. **When project progression requires that the hard barrier be removed, the Contractor must inform the Owner in writing (email) <u>prior</u> to removing the wall(s). Under no circumstances except in a dire emergency shall the hard barrier walls be removed without prior approval**.

3. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
4. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

F. Electric Power Service: When located within the hospital, connect to Owner's existing electric power service. When located outside of the hospital, connect to utility services using all necessary precautions in accordance with the NEC and utility provider’s requirements. Maintain equipment in a condition acceptable to Owner.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

C. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

2. Maintain and touchup signs so they are legible at all times.

D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

E. Existing Elevator Use: Use of Owner's existing elevators will be permitted where applicable, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
3. Coordinate with the Owner for transport of heavy items.

F. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

B. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

F. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.

1. Construct dustproof partitions with one of the following methods.
   a. Gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
   b. Premanufactured modular wall system constructed of rigid plastic barrier walls and metal framework.

2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
3. Insulate partitions to control noise transmission to occupied areas.
4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
5. Protect air-handling equipment.
6. Provide walk-off mats at each entrance through temporary partition.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SPP #ICQ-55
Hospital Renovation and New Construction Projects/IP Permit and Risk Assessment
Attachment A
Page 1 of 3

INFECTION CONTROL RISK ASSESSMENT (ICRA))

TYPE OF CONSTRUCTION ACTIVITY OR PROJECT (circle type of project):

Level 1	Level II	Level III
Inspection and non-invasive activities such as removal of ceiling tiles for visual inspection, painting without sanding, wallcovering, electrical trim work, minor plumbing, all activities that do not generate dust or require cutting of walls	Short duration activities such as installation of telephone and computer cables, cutting of walls or ceiling where dust can be controlled by using temporary zip walls	Any activity that generates moderate to high levels of dust or requires demolition or removal of any fixed building components such as the sanding of walls or painting or wall coverings, removal of floor coverings, ceiling tiles, and casework, new wall construction, minor duct work, electrical work above the ceiling, major cabling activities. Major demolition and construction or renovation projects such as any activity that requires consecutive work shifts. Any new construction or removal of a complete cabling system.

RISK GROUPS (circle area involved):

Low Risk	Medium Risk	High Risk	Highest Risk
All Office areas All Public areas	Admitting Outpatient Areas Food & Nutrition prep areas Radiology Nuclear Medicine MRI Endoscopy Services Outpatient Physical Therapy	Emergency Center Family Birth Center MFSC Pediatrics PACU Pharmacy Newborn Nursery Clinical Pathology Central Stores Outpatient Surgery 3 East 3 West Family Care Unit 4 East 4 West 5 East 5 West RT Blood Gas Rooms Supportive Care Unit Geriatric Trauma	Bone Marrow Transplant Unit Burn Intensive Care Unit Cardiac Cath Lab/6 East Heart Station Sterile Processing Operating Room, including C-Section rooms Negative Air Pressure Rooms, Isolation rooms Surgical Intensive Care Unit Cardiac Intensive Care Unit/6 West Medical Intensive Care Unit Dialysis Unit Pediatric Intensive Care Unit Southwest Cancer Treatment and Research Center Neonatal Intensive Care

RISK CLASS DETERMINATION (match level of project with risk group to determine Risk Class):
Risk Class May be Adjusted Based on Location of Project

RISK GROUPS	Level 1	Level 2	Level 3
Low Risk	I	II	II
Medium Risk	I	II	III
High Risk	I	II	III
Highest Risk	II	II or III	III

Risk Class I:

- Meet with the Infection Preventionist/Construction Committee and obtain ICRA permit before project begins.
- Post ICRA permit at job site in a visible area outside of the construction/renovation site.
- Wet wipe the area when job is completed.
- Wear protective clothing (cover gown) when up in the ceiling. This protects the construction workers clothes and prevents spreading the dust and dirt throughout the facility once the worker is finished with the project.
- If ceiling tiles have been removed replace within 30-40 minutes.

Risk Class II

- Meet with the Infection Preventionist/Construction Committee and complete assessment.
- Obtain ICRA permit before project begins.
- Contact Manager or Director of affected area.
- Post ICRA permit at job site in a visible area outside of the construction/renovation site.
- Minimize dust to prevent airborne contamination.
- Wear protective clothing (cover gown) when up in the ceiling. This protects the construction workers clothes and prevents spreading the dust and debris throughout the facility once the worker is finished with the project.
- Use plastic zip barriers and seal unused doors with tape.
- Restrict access to area as much as possible. Re-route traffic if possible.
- Provide and use walk-off track mats. Ensure mats are sticky and change as needed.
- Block off or seal air vents to prevent dust and debris from being circulated throughout the facility.
- Contain construction waste in tightly clean covered containers. Use the safest route to remove waste.
- Wet mop the area. This is the responsibility of the construction worker or the facilities EVS department.

Risk Class III (precautions may be adjusted based on risk):

- Meet with the Infection Preventionist/Committee and complete assessment.
- Obtain ICRA permit before project begins.
- Contact Manager or Director of affected area.
- Post ICRA permit at job site in a visible area outside, but near, the construction/renovation site.
- Construct solid barriers ***before project begins.*** The barrier must be well sealed. The barrier, if sheet rock, must have all seams taped and the entire barrier must be painted.
- Construct *anteroom.* This provides the construction worker a place to remove contaminated cover gowns before walking throughout the facility.
- Maintain negative air pressure within the work site.
- Use air scrubbers.
- All construction workers must wear protective clothing to prevent their own clothes from becoming contaminated. This prevents the worker from spreading dust and debris throughout the facility when not in the construction site.
- Contain and remove construction waste in tightly covered containers. The covered containers are to be wiped down before moving throughout the facility.

- When removing waste in tightly covered containers use the quickest and safest route keeping in mind the safety of the staff and patients.
- Protect the HVAC from contamination. Block off or seal air vents to prevent dust and debris from being circulated throughout the facility.
- Restrict access and control traffic using signage to re-route staff and visitors.
- Provide and use walk-off track mats. Ensure mats are sticky and change as needed.
- When the project is complete, a terminal clean by EVS must be completed. Once the first TC has been completed, the barriers may be removed and a second TC is completed by EVS.
- The area of the project must be inspected by Infection Prevention and Control before it is occupied.

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

a. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product,

that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

   a. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Coordination of Owner-installed products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
3. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
4. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Mechanical systems piping and ducts.
    f. Control systems.
    g. Communication systems.
    h. Fire-detection and -alarm systems.
    i. Conveying systems.
    j. Electrical wiring systems.
    k. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

    a. Water, moisture, or vapor barriers.
    b. Membranes and flashings.
    c. Exterior curtain-wall construction.
    d. Sprayed fire-resistive material.
    e. Equipment supports.
    f. Piping, ductwork, vessels, and equipment.
    g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Section 018113.13 "Sustainable Design Requirements - LEED for New Construction and Major Renovations," Section 018113.16 "Sustainable Design Requirements - LEED for Commercial Interiors," Section 018113.19 "Sustainable Design Requirements - LEED for Core and Shell Development," and Section 018113.23 "Sustainable Design Requirements - LEED for Schools."

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other

construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

E. Surface and Substrate Preparation: Comply with manufacturer's written recommendations for preparation of substrates to receive subsequent work.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. 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. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Final cleaning.
4. Repair of the Work.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Section 017300 "Execution" for progress cleaning of Project site.
3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
2. Complete final cleaning requirements, including touchup painting.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use form agreeable to Architect

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.

4. Submit list of incomplete items in the following format:
a. PDF electronic file. Architect will return annotated file.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

    1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Warranties
2. Record Drawings.
3. Record Specifications.
4. Record Product Data.
5. Miscellaneous record submittals.

B. Related Requirements:

1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

A. General: Submit (2) flash drives with the required information on each. Organize the Data on the flash drive into the following categories.

B. Warranties

1. Submit warranties for all Sub-Contracted portions of the work.
2. Submit Builder’s Warranty for one year starting at the date of Substantial Completion as issued by the Architect.

C. Record Drawings: Comply with the following:

1. Number of Copies: Submit one complete set of marked-up record prints.
2. Indicate all changes that were incorporated into the work including but not limited to addendum items and supplemental drawings.

D. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

E. Record Product Data: Submit one copy of each final, approved submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

F. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one copy of each submittal.

G. Reports: Submit written report indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

H. **SDS:** Submit Safety and Data Sheets for **ALL** products incorporated into the Project.

PART 2 - PRODUCTS

2.1 PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Prepare Warranties in electronic format.
2. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

2.2 RECORD DRAWINGS

A. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
    b. Architect will provide data file layer information. Record markups in separate layers.

5. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

6. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

7. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
8. Use colors to distinguish between changes for different categories of the Work at same location.
9. Mark important additional information that was either shown schematically or omitted from original Drawings.
10. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: **Organize record prints and newly prepared record Drawings into manageable sets. Scan each page and combine to create one PDF Drawing Set. Use Bookmarks and links to organize the sheets in the file. Include identification on cover sheets.**
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.3 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

2.4 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.5 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. **Format:** Submit miscellaneous record submittals as PDF electronic file, **each section bookmarked digitally, as to properly organize the data.**

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

C. Submit additional documents as follows:

1. Building inspection approval
2. Certificate of Occupancy
3. Fire alarm installation certificate
4. Fire Marshal approval letter
5. Fire sprinkler approval letter (city inspection)
6. Automatic Fire Sprinkler Shop Drawings with Fire Marshal’s approval
7. HVAC TAB report with deficiencies noted and corrected
8. Electrical system grounding report
9. Med gas testing and certification

2.6 SAFETY & DATA SHEETS (SDS)

A. Safety and Data Sheets for **ALL** products incorporated into the Project are to be provided at the end of the Work.
   1. Organize data by Project Manual Section Designations. Scan and index data in PDF format. Use a Table of Contents, Bookmarks, and links to properly organize the data.
   2. Include on each sheet a description of where the product was utilized.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Submit before Work begins.

B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

C. Qualification Data: For refrigerant recovery technician.

D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove items as discussed at the pre-construction meeting. Items remaining that are not addressed are to be brought to the Owner’s attention and Owner is to be provided sufficient time to remove all desired materials.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs and/or preconstruction videotapes.

1. Comply with requirements specified in Section 013233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. **Remove all abandoned utilities back to their source and cap or plug as directed with compatible materials.**

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Reuse of Building Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish building elements beyond what is indicated on Drawings without Architect's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Store items in a secure area until delivery to Owner.
3. Transport items to Owner's storage area designated by Owner.
4. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers unless prior authorization to do so is provided by the Owner.

F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Division 7 for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wood blocking and nailers.
2. Plywood backing panels.

B. Related Requirements:

1. Section 061600 "Sheathing."

1.3 DEFINITIONS

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NLGA: National Lumber Grades Authority.
2. WCLIB: West Coast Lumber Inspection Bureau.
3. RIS: Redwood Inspection Service.
4. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping,] and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency. **Stamp must be visible upon inspection.**

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by testing agency.

E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, and the following:

1. Framing for raised platforms.
2. Framing for stages.
3. **<u>All</u> Concealed blocking.**

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Cants.
4. Furring.
5. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.

C. For concealed boards, provide lumber with 15 percent maximum moisture content and the following species and grades:

1. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with approved fastener patterns where applicable.

2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

M. **Install 2x6 wood blocking behind gypsum board at all door hardware wall stop locations. Securely attach blocking to adjacent studs.**

N. **Install 2x6 wood blocking behind gypsum board at all toilet accessories and compartment anchor locations. Securely attach blocking to adjacent studs.**

O. **Install 2x6 wood blocking behind gypsum board at all undercounter support bracket locations. Securely attach blocking to adjacent studs.**

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- size furring horizontally at 24 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- size furring vertically at 16 inches o.c.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory.".

2.2 WOOD PANEL PRODUCTS

A. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood unless otherwise indicated and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings, and the following:

1. Roof and wall sheathing within 48 inches of fire walls.

2.5 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Type and Thickness: Regular, 1/2 inch thick.
2. Size: 48 by 96 inches for vertical installation.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

B. Power-Driven Fasteners: NES NER-272.

C. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.7 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall and Roof Sheathing:

a. Screw to cold-formed metal framing.
b. Space panels 1/8 inch apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to wood framing with screws.
2. Fasten gypsum sheathing to cold-formed metal framing with screws.
3. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
4. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.
2. Section 123661 “Simulated Stone Countertops” for countertops scheduled with Solid Surface, Quartz, Granite, or other such materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate and cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

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 electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.

C. Samples for Verification:

1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
2. Wood-grain plastic laminates, 8 by 10 inches, for each type, pattern and surface finish, with one sample applied to core material and specified edge material applied to one edge.
3. Thermoset decorative panels, 8 by 10 inches, for each color, pattern, and surface finish, with edge banding on one edge.
4. Corner pieces as follows:

    a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.

b. Miter joints for standing trim.

5. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Product Certificates: For each type of product including the following:

1. Composite wood products.
2. High-pressure decorative laminate.
3. Glass.
4. Adhesives.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of products and/or Certified participant in AWI's Quality Certification Program.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of typical plastic-laminate cabinets as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets 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. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

B. Grade: Custom.

C. Type of Construction: **Reveal overlay**.

D. Cabinet, Door, and Drawer Front Interface Style: **Reveal overlay**.

E. Reveal Dimension: **1/4 inch**.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

G. Laminate Cladding for Exposed Surfaces **(Anything visible when looking at cabinets from either standing or sitting position and tops of upper cabinets)**:

1. Horizontal Surfaces: Grade HGS.
2. Vertical Surfaces: Grade HGS.
3. Edges: Grade HGS.
   a. Cabinet doors and Drawer fronts: (either)
      1) Grade HGS to match face laminate. Install edge banding before face laminate.

2) 3mm PVC edge banding that matches face laminate. Sample must be submitted and approved by Architect to match. Otherwise, laminate edge banding will be required.

4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

H. Materials for Semi-exposed Surfaces (areas behind closed doors or drawers):

1. Surfaces Other Than Drawer Bodies: 3/4" Thermoset Decorative Panels

a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding **on all edges**.
c. For semi-exposed backs of panels with exposed plastic-laminate surfaces **(i.e. cabinet doors or drawer fronts)**, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides Subfronts and Backs: ½" thick, 7 ply Baltic birch plywood with sealer.
3. Drawer Bottoms: 1/4" Thermoset decorative panels.

I. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

J. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

K. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with **Shoulder Lock, glued and pin nailed**.

L. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

a. Refer to the Finish and Materials Schedule in Section 099999.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 4 to 9 percent.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
2. Thermoset Decorative Panels: Medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
3. Hardboard: Tempered Masonite, ¼" thick at form shelves where indicated.
4. **NO PARTICLEBOARD SHALL BE USED ANYWHERE IN THE PRODUCTION OF THE MILLWORK**.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087100 "Door Hardware."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.

C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

D. Catches: Hafele Automatic Door Catch 245.58.754 (245.58.156 for bronze finish where indicated) at all pairs of doors indicated with cam lock.

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.

F. Shelf Rests: BHMA A156.9, B04013; metal.

G. Drawer Slides: BHMA A156.9.

1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
2. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
3. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
4. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-200.

H. Grommets for Cable Passage through Countertops: 2-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "TG3 series" by Doug Mockett & Company, Inc.

I. Door Locks: BHMA A156.11, E07121. **Contractor is to coordinate keying schedule with Owner. Keying may be, at the Owner's option, either keyed alike, keyed separately, or a combination of the above. Architect will locate on Contractor's shop drawings.**

J. Drawer Locks: BHMA A156.11, E07041. **Contractor is to coordinate keying schedule with Owner. Keying may be, at the Owner's option, either keyed alike, keyed separately, or a combination of the above. Architect will locate on Contractor's shop drawings.**

K. Door and Drawer Silencers: BHMA A156.16, L03011.

L. Countertop Support: Rakks extruded aluminum counter support bracket in recommended size for countertop depth and height. Off-White Powder coat finish.

M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

N. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 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 metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate cabinets to dimensions, profiles, and details indicated.

C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

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 before disassembling for shipment.

D. Shop-cut openings to maximum extent possible to receive hardware, appliances, 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.

E. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

1. Use filler matching finish of items being installed.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, 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 cabinets on exposed and semi-exposed surfaces.

END OF SECTION 064116

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Glass-fiber blanket insulation.

B. Related Sections:

1. Section 061600 "Sheathing" for foam-plastic board sheathing over wood or steel framing.
2. Section 078446 "Fire-Resistive Joint Systems" for insulation installed as part of a perimeter fire-resistive joint system.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.5 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.

3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATION

A. **For each of the Products listed below, each must come from a single approved manufacturer. Mixing of different manufacturer's similar products on the project is not acceptable.**

2.2 GLASS-FIBER BLANKET INSULATION

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

1. CertainTeed Corporation.
2. Johns Manville.
3. Knauf Insulation.
4. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Where used on interior applications for sound attenuation, select batts with the highest STC rating for the application.

C. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
    b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.3 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches up either side of partitions.

END OF SECTION 072100

SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes sprayed fire-resistive materials (SFRM).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Framing plans, schedules, or both, indicating the following:

1. Extent of fireproofing for each construction and fire-resistance rating.
2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
4. Treatment of fireproofing after application.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions in size.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of fireproofing.

C. Evaluation Reports: For fireproofing, from ICC-ES.

D. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.

1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 44 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

1.8 COORDINATION

A. Sequence and coordinate application of SFRM with other related work specified in other Sections to comply with the following requirements:

1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
2. Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
3. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
4. Do not apply fire-resistive material to metal roof deck substrates until concrete topping, if any, has been completed. For metal roof decks without concrete topping, do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic during application and drying of fire-resistive material.
5. Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.
6. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
7. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
8. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and tested and corrections have been made to defective applications.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace SFRMs that fail in materials or workmanship within specified warranty period.

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

a. Cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of SFRM from substrates.
b. Not covered under the warranty are failures due to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Source Limitations: Obtain fireproofing from single source.

C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

D. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction.

E. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

A. SFRM: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Southwest Fireproofing Products Co.; Type 5MD.

2. Density: Not less than 22 lb/cu. ft. and as specified in the approved fire-resistance design, according to ASTM E 605.
3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 0.375 inch.
4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 0.

b. Smoke-Developed Index: 0.

5. Compressive Strength: Minimum 50 lbf/sq. in. according to ASTM E 761.
6. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
7. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
8. Air Erosion: Maximum weight loss of 0.005 g/sq. ft. in 24 hours according to ASTM E 859.
9. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G 21.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:

1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.

C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.

D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:

1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.

B. Verify that roof construction, installation of roof-top HVAC equipment, and other related work is complete before beginning fireproofing work.

C. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.

B. Clean substrates of substances that could impair bond of fireproofing.

C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.

1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.

D. Metal Decks:

1. Do not apply fireproofing to underside of metal roof deck until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.

E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

F. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.

G. Extend fireproofing in full thickness over entire area of each substrate to be protected.

H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

I. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.

J. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.

K. Cure fireproofing according to fireproofing manufacturer's written recommendations.

L. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

M. Finishes: Where indicated, apply fireproofing to produce the following finishes:

1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.

3.4 FIELD QUALITY CONTROL

A. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

B. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.

C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

D. Repair fireproofing damaged by other work before concealing it with other construction.

E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

B. Related Sections:

1. Section 078446 "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
b. Classification markings on penetration firestopping correspond to designations listed by the following:

1) UL in its "Fire Resistance Directory."

D. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Hilti, Inc.
2. RectorSeal Corporation.
3. Specified Technologies Inc.
4. 3M Fire Protection Products.
5. Tremco, Inc.; Tremco Fire Protection Systems Group.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and fire partitions.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Horizontal assemblies include floors and floor/ceiling assemblies.
2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:

a. Slag-wool-fiber or rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

B. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

C. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

D. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.6 PENETRATION FIRESTOPPING SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Contractor to submit a firestopping system schedule to include all anticipated applications. Schedule should indicate the type of wall/floor being penetrated, the penetrating object, the required fire-rating of the system, and the selected system to be used. All data cabling penetration systems are to utilize a firestop device that allows for addition and removal of data cables without compromising the integrity of the system. Provide devices with 125% capacity of the lines scheduled to pass through the system.

END OF SECTION 078413

SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints in smoke barriers.

B. Related Sections:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.

1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

B. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:

1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:

a. Fire-resistive joint system products bear classification marking of qualified testing agency.
b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:

1) UL in its "Fire Resistance Directory."

D. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

C. Notify Owner's testing agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-

resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:

1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies, and roofs or roof/ceiling assemblies.
2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Fire Trak Corp.
b. Hilti, Inc.
c. RectorSeal Corporation.
d. Specified Technologies Inc.
e. 3M Fire Protection Products.
f. Tremco, Inc.; Tremco Fire Protection Systems Group.

C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.

1. L-Rating: Not exceeding 5.0 cfm/ft of joint at 0.30 inch wg at both ambient and elevated temperatures.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Hilti, Inc.
b. RectorSeal Corporation.
c. Specified Technologies Inc.
d. 3M Fire Protection Products.
e. Tremco, Inc.; Tremco Fire Protection Systems Group.

D. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.5 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

B. Contractor to submit a fire-resistive joint system schedule to include all anticipated applications. Schedule should indicate the location of the joint, the types of items being joined, the required fire-rating of the system, and the selected system to be used.

END OF SECTION 078446

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.

B. Related Sections:

1. Section 079500 "Expansion Control" for building expansion joints.
2. Section 078446 "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
3. Section 088000 "Glazing" for glazing sealants.
4. Section 092900 "Gypsum Board" for sealing perimeter joints.
5. Section 093000 "Tiling" for sealing tile joints.
6. Section 095113 "Acoustical Panel Ceilings" for sealing edge moldings at perimeters with acoustical sealant.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

C. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

2.3 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

B. Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type S, Grade NS, Class 25, for Use T.

2.4 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.5 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.6 MISCELLANEOUS MATERIALS

A. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

    a. Isolation and contraction joints in cast-in-place concrete slabs.

2. Urethane Joint Sealant: Single component, nonsag, traffic grade.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Control and expansion joints in unit masonry.
    b. Joints in exterior insulation and finish systems.
    c. Joints at perimeter of metal panel system trim.
    d. Joints between adhered stone and adjacent materials.
    e. Joints between different materials listed above.
    f. Perimeter joints between materials listed above and frames of doors and windows.

2. Urethane Joint Sealant: Single component, nonsag, Class 50.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

    a. Isolation joints in cast-in-place concrete slabs.

2. Urethane Joint Sealant: Single component, nonsag, traffic grade.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Control and expansion joints on exposed interior surfaces of exterior walls.

b. Perimeter joints of exterior openings where indicated.
c. Vertical joints on exposed surfaces of walls.
d. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
e. Joints between millwork countertops and adjacent walls.
f. Joints between wall protection trim components and mounted wall.

2. Joint Sealant: Latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors, including custom colors, to color match to dominant adjacent material.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Joints between toilet accessories and adjacent walls where accessories are intended to be permanently mounted.

2. Silicone Joint Sealant: Single Component, nonsag, neutral curing, Class 50.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 079500 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior expansion control systems.
2. Exterior wall expansion control systems.

B. Related Requirements:

1. Section 078446 "Fire-Resistive Joint Systems" for liquid-applied joint sealants in fire-resistive building joints.
2. Section 079200 "Joint Sealants" for liquid-applied joint sealants and for elastomeric sealants without metal frames.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

B. Samples for Initial Selection: For each type of expansion control system indicated.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

C. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion control system.
2. Expansion control system location cross-referenced to Drawings.
3. Nominal joint width.
4. Movement capability.
5. Classification as thermal or seismic.
6. Materials, colors, and finishes.
7. Product options.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.

B. Coordination: Coordinate installation of exterior wall and soffit expansion control systems with roof expansion control systems to ensure that wall transitions are watertight. Roof expansion joint assemblies are specified elsewhere.

2.2 INTERIOR EXPANSION CONTROL SYSTEMS

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

B. Source Limitations: Obtain expansion control systems from single source from single manufacturer.

C. Floor-to-Floor:

1. Design Criteria:

a. Nominal Joint Width: As Required. Refer to Drawings
b. Movement Capability: +/-25 percent.
c. Load Capacity:

1) Uniform Load: 150 lb/sq. ft..
2) Concentrated Load: 2000 lb.
3) Maximum Deflection: 0.5 inch.

2. Type: Elastomeric seal, recessed.

a. Metal: Aluminum.

1) Finish: Clear anodic, Class II.

b. Seal Material: Santoprene.

1) Color: As selected by Architect from manufacturer's full range.

D. Wall-to-Wall:

1. Design Criteria:

a. Nominal Joint Width: As Required. Refer to Drawings.
b. Movement Capability: +/- 25 percent.

2. Type: Elastomeric seal.

a. Metal: Aluminum.

1) Finish: Clear anodic, Class II.

b. Seal Material: Santoprene.

1) Color: As selected by Architect from manufacturer's full range.

E. Wall Corner:

1. Design Criteria:

a. Nominal Joint Width: As Required. Refer to Drawings.
b. Movement Capability: +/- 25 percent.

2. Type: Elastomeric seal.

a. Metal: Aluminum.

1) Finish: Clear anodic, Class II.

b. Seal Material: Santoprene.

1) Color: As selected by Architect from manufacturer's full range.

F. Ceiling-to-Ceiling :

1. Design Criteria:

a. Nominal Joint Width: As Required. Refer to Drawings.
b. Movement Capability: +/- 25 percent.

2. Type: Elastomeric seal.

a. Metal: Aluminum.

1) Finish: Clear anodic, Class II.

b. Seal Material: Santoprene.

1) Color: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard moisture barrier consisting of a continuous, waterproof membrane within joint and attached to substrate on sides of joint below the primary cover.

2.4 MATERIALS

A. Aluminum: ASTM B 221 , Alloy 6063-T5 for extrusions; ASTM B 209 , Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: ASTM E 1783; preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

D. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.

E. Moisture Barrier: Flexible elastomeric material, PVC, minimum 30 mils thick.

F. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

G. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.5 GENERAL FINISH REQUIREMENTS

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: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion control system manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion control systems.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper expansion control system installation and performance.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
4. Repair or grout blockout as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
5. Install frames in continuous contact with adjacent surfaces.

    a. Shimming is not permitted.

6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Foam Seals: Install with adhesive recommended by manufacturer.

E. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.

F. Moisture Barrier: Provide at all exterior joints and where indicated on Drawings. Provide drainage fittings where indicated on Drawings.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

SECTION 081213 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes hollow-metal frames.

B. Related Requirements:

1. Section 081416 "Flush Wood Doors" for wood doors installed in hollow-metal frames.
2. Section 099123 “Interior Painting” for field painting of hollow-metal frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
2. Locations of reinforcement and preparations for hardware.
3. Details of each different wall opening condition.
4. Details of anchorages, joints, field splices, and connections.
5. Details of moldings, removable stops, and glazing.
6. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification: Prepare Samples to demonstrate compliance with requirements for quality of materials and construction. Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of frame assembly, for tests performed by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each unit to permit air circulation.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2.2 INTERIOR FRAMES

A. Construct interior frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.
2. Materials: Uncoated steel sheet, minimum thickness of 16 gauge.
3. Construction: Full profile welded.
4. Exposed Finish: Prime.

2.3 FRAME ANCHORS

A. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.4 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

2.5 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
4. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Three anchors per jamb up to 60 inches high.
2) Four anchors per jamb from 60 to 90 inches high.
3) Five anchors per jamb from 90 to 96 inches high.
4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

b. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

5. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

7. Terminated Stops: When indicated in the schedule, terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

C. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce frames to receive nontemplated, mortised, and surface-mounted hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

D. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.6 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap frames to receive nontemplated, mortised, and surface-mounted hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
5. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
6. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081213

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with plastic-laminate faces.
2. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction and trim for openings.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Fire-protection ratings for fire-rated doors.

C. Samples for Verification:

1. Plastic laminate or veneer as applicable, 6 inches square, for each color, texture, and pattern selected.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.

a. Provide Samples for each color, texture, and pattern of plastic laminate required.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

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

   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.

B. Fire-Rated Wood Doors: When indicated in the schedule, provide doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
3. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
4. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
5. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

C. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

D. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2.
2. Blocking: Provide wood blocking in particleboard-core doors as follows:

a. 5-inch top-rail blocking, in doors indicated to have closers.
b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
c. 5-inch midrail blocking, in doors indicated to have exit devices.

E. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:

a. 5-inch top-rail blocking.
b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
c. 5-inch midrail blocking, in doors indicated to have armor plates.
d. 5-inch midrail blocking, in doors indicated to have exit devices.

3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

a. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

2.2 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors:

1. Grade: Custom.

2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
3. Colors, Patterns, and Finishes: **Refer to Finish and Materials Schedule Section 099999.**
4. Exposed Vertical and Top Edges: Plastic laminate that matches faces, applied before faces.
5. Core: Particleboard.
6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.

2.3 LIGHT FRAMES

A. Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with field painted, sprayed finish in a color to be determined by the Architect and approved for use in doors of fire-protection rating indicated.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

C. Openings: Factory cut and trim openings through doors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.

2. Install smoke- and draft-control doors according to NFPA 105.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Access doors and frames for walls and ceilings.

B. Related Requirements:

1. Section 099123 “Interior Painting” for field painting of access doors and frames.
2. Section 233300 "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.

D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: For access doors located in fire-rated assemblies, provide units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

B. Flush Access Doors with Exposed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
2. Locations: Wall and ceiling of non-fire rated assemblies.
3. Door Size: 2'x2'.
4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.

    a. Finish: Factory prime.

5. Frame Material: Same material, thickness, and finish as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

C. Fire-Rated, Flush Access Doors with Exposed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide manufacturer's standard-width exposed flange, proportional to door size.
2. Locations: All access doors located in fire-rated wall or ceiling assemblies.
3. Fire-Resistance Rating: Not less than that of adjacent construction.
4. Uncoated Steel Sheet for Door: Nominal 0.036 inch, 20 gage.

    a. Finish: Factory prime.

5. Frame Material: Same material, thickness, and finish as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

D. Hardware:

1. Lock: Cylinder. **Coordinate keying with remainder of keyed building hardware and with Owner's requirements.**

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Frame Anchors: Same type as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.

2.5 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: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Storefront framing for punched openings.
3. Exterior and interior manual-swing entrance doors and door-frame units.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.

4. Glazing.
5. Flashing and drainage.

F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

a. Thermal stresses transferring to building structure.
b. Glass breakage.

c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.
e. Failure of operating units.

B. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

2.2 FRAMING

A. Basis of Design: The design for aluminum-framed systems is based on Kawneer 451.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Center.
4. Finish: Clear anodic finish.
5. Fabrication Method: Field-fabricated stick system.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209.
b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.

2.3 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Wide stile; 5-inch nominal width. **Bottom stile is to be 10” tall.**
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide nonremovable glazing stops on outside of door.

2.4 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products **or approved equal with prior written approval obtained prior to bidding process.**
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
3. Opening-Force Requirements:

a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbfto set the door in motion and not more than 15 lbf to open the door to its minimum required width.
b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

C. Butt Hinges: BHMA A156.1, Grade 1, radius corner.

1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.
2. Exterior Hinges: Stainless steel, with stainless-steel pin.
3. Quantities:

a. For doors up to 87 inches high, provide three hinges per leaf.
b. For doors more than 87 and up to 120 inches high, provide four hinges per leaf.

D. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.

E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

F. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

G. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

H. Cylinders: As specified in Section 087100 "Door Hardware."

1. Keying: As specified in Section 087100 "Door Hardware.".

I. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

J. Operating Trim: BHMA A156.6.

K. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

L. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

M. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

N. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

O. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.5 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

2.6 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Storefront Framing: Fabricate components for assembly using shear-block system.

G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

I. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

J. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:

a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.

b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 ENTRANCE DOOR HARDWARE SETS

A. To be included in Addendum #1.

END OF SECTION 084113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:

a. Swinging doors.
b. Sliding doors.

2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

B. Related Sections:

1. Section 064116 "Plastic-Laminate-Faced Architectural Cabinets" for cabinet door hardware provided with cabinets.
2. Section 081416 "Flush Wood Doors" for astragals and integral intumescent seals provided as part of labeled fire-rated assemblies.
3. Section 083113 "Access Doors and Frames" for access door hardware, cylinders.
4. Section 083323 "Overhead Coiling Doors" for door hardware provided as part of overhead door assemblies.
5. Section 083326 "Overhead Coiling Grilles" for door hardware provided as part of overhead grille assemblies.
6. Section 084113 "Aluminum-Framed Entrances and Storefronts" for entrance door hardware, except cylinders.
7. Section 084229.23 "Sliding Automatic Entrances" for entrance door hardware, except cylinders.
8. Section 134900 "Radiation Protection" for lead-lined astragals provided as part of labeled fire-rated assemblies.
9. Section 283111 "Digital, Addressable Fire-Alarm System" for connections to building fire-alarm system.

C. Products furnished, but not installed, under this Section include the products listed below. Coordinating and scheduling the purchase and delivery of these products remain requirements of this Section.

1. Permanent lock cores to be installed by Owner when applicable.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: For power, signal, and control wiring and including the following:

a. Details of interface of electrified door hardware and building safety and security systems.
b. Schematic diagram of systems that interface with electrified door hardware.
c. Point-to-point wiring.
d. Risers.
e. Elevations doors controlled by electrified door hardware.

2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.

1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.

a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
c. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
d. Content: Include the following information:

1) Identification number, location, hand, fire rating, size, and material of each door and frame.
2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
5) Fastenings and other pertinent information.
6) Explanation of abbreviations, symbols, and codes contained in schedule.
7) Mounting locations for door hardware.
8) List of related door devices specified in other Sections for each door and frame.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For electrified door hardware, from the manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

C. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware schedule.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Source Limitations: Obtain each type of door hardware from a single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

D. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

F. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

G. Accessibility Requirements: For door hardware on doors in an accessible route, comply with **the Texas Accessibility Standards**.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:

   a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
   b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
   c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

H. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." In addition to Owner, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's security consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Requirements for access control.
5. Address for delivery of keys.
6. **All locks shall be keyed per Owner’s request.**

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.8 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

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

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

a. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products **or approved equal with prior written approval obtained prior to bidding process.**
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.3 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

2.4 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

2.5 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturer: Same manufacturer as for locking devices.

B. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.6 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Existing System:

a. Master key or grand master key locks to Owner's existing system.
b. Re-key Owner's existing master key system into new keying system.

2. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: Information to be furnished by Owner.

2.7 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

B. Provide regular or parallel arms as needed to locate closers on room side of doors and not in corridors. Closers may be scheduled only as the Model Series and may not contain all designations required for arm designations. All closers are to include optional through-bolting on doors.

2.8 ELECTROMAGNETIC STOPS AND HOLDERS

A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.

2.9 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

B. **Provide gasketing at all rated doors whether scheduled or not. If rated doors are scheduled with silencers, replace this designation with gasketing as required for proper seal.**

2.10 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.11 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- thick base metal; with manufacturer's standard machine or self-tapping screw fasteners.

2.12 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized

industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

    a. Wood or Machine Screws: For the following:

        1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
        2) Strike plates to frames.
        3) Closers to doors and frames.

    b. Steel Through Bolts: For the following unless door blocking is provided:

        1) Surface hinges to doors.
        2) Closers to doors and frames.
        3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.13 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

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 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.

E. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.
2. Furnish permanent cores to Owner for installation.

F. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.

1. Configuration: Provide one power supply for each door opening with electrified door hardware.

H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Section 017900 "Demonstration and Training."

3.7 DOOR HARDWARE SCHEDULE

A. To be included in Addendum #1.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Storefront framing.
4. Interior borrowed lites.

B. Related Sections:

1. Section 088300 "Mirrors."

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Accessory Samples: For gaskets and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass and glazing products, from manufacturer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass, coated glass, insulating glass, glazing sealants, and glazing gaskets.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Source Limitations for Glass: Obtain all scheduled glass from single source from single manufacturer for each glass type.

D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

E. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

F. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

G. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.

H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes enhanced-protection testing requirements in ASTM E 1996 for the applicable Wind Zone for the project location when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.

1. Large-Missile Test: For glazing located within 30 feet of grade.
2. Small-Missile Test: For glazing located more than 30 feet above grade.
3. Large-Missile Test: For all glazing, regardless of height above grade.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.
3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.3 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

B. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, clear float glass; with intumescent interlayers; complying with testing requirements in 16 CFR 1201 for Category II materials.

2.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

2.7 MONOLITHIC-GLASS TYPES

A. **Glass Type G-1:** Clear float glass or fully tempered float glass where required by code.

1. Thickness: 6.0 mm.
2. Provide safety glazing labeling.

2.8 FIRE-PROTECTION-RATED GLAZING TYPES

A. **Glass Type G-2**: 90-minute fire-rated glazing; laminated glass with intumescent interlayers.

1. Provide safety glazing labeling.

B. **Glass Type G-3:** 120-minute fire-rated glazing; laminated glass with intumescent interlayers.

1. Provide safety glazing labeling.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

C. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following types of silvered flat glass mirrors:

1. Film-backed glass mirrors qualifying as safety glazing.

B. Related Sections:

1. Section 088000 "Glazing" for glass with reflective coatings used for vision and spandrel lites.
2. Section 102800 "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

D. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.

2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Safety Glazing Products: For film-backed mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

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

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

A. Glass Mirrors, General: ASTM C 1503.

B. Clear Glass: Mirror Glazing Quality.

1. Nominal Thickness: 6.0 mm.

2.2 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

A. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.05 inch.
2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.062 inch.
3. Finish: Clear bright anodized.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.4 FABRICATION

A. Mirror Edge Treatment: Rounded polished.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

B. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Wall-Mounted Mirrors: Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Top and Bottom Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.

3.3 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For “Equivalent Gauge” steel studs and runners, from ICC-ES.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATION

A. **For each of the Products listed below, each must come from a single approved manufacturer. Mixing of different manufacturer’s similar products on the project is not acceptable.**

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Horizontal Deflection:
1. Walls surrounding stairs, elevator hoistways, or other shafts connecting floors, limited to L/240 based on horizontal loading of 10 lbf/sq. ft.
2. Walls enclosing any interior spaces that are subject to exterior wind conditions such as lobbies, vestibules, loading docks, etc., limited to L/240 based on horizontal loading of 15 lbf/sq. ft.

3. Walls scheduled to receive tile finishes, limited to L/360 based on horizontal loading of 5 lbf/sq. ft.
4. Typical interior wall assemblies (not listed above), limited to L/240 of the wall height based on horizontal loading of 5 lbf/sq. ft.
5. Interior ceilings, soffits, or furrdowns, limited to L/360 based on horizontal loading of 5 lbf/sq. ft.

2.3 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C 645. Use either steel studs and runners or "equivalent gauge" steel studs and runners.

1. Steel Studs and Runners:

a. Minimum Base-Metal Thickness: 0.0312 inch (30 mil) / 20 ga./ 33ksi
b. Flange Size: 1 1/4 inch
c. Depth: As indicated on Drawings

2. "Equivalent Gauge" Steel Studs and Runners:

a. Minimum Base-Metal Thickness: 0.0312 inch (30 mil)/ 33ksi
b. Flange Size: 1 1/4 inch
c. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs fit into pre-slotted slip track and secured per manufacturer's written recommendations.

D. Firestop Tracks: Where Fire-resistive rated walls are indicated on the Drawings or otherwise required.

1. Top runner manufactured to allow heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.

1. Depth: 1-1/2 inches.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.033 inch.
2. Depth: As indicated on Drawings.

G. Radius Framing: Where curved walls are indicated on the Drawings.

1. Steel sheet runner for non-load bearing curves, bends, variable radii and arches using a work-hardened steel base strip.

H. Shaftwall System: Non-load-bearing fire-rated wall assemblies that provide critical, life-safety, fire-resistant protection for elevator shafts, stairwells, vertical chases, and mechanical enclosures.

1. C-T shaped studs that accepted 1 inch liner panels on one side and 2 layers of gypsum board on the opposite side.
2. Tabbed J-shaped runner track for attachment of studs.
3. Minimum Base-Metal Thickness: 0.0312 inch (33 mil) / 20 ga.
4. Depth: As indicated on Drawings.

2.4 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete where applicable:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 9ga/ 0.0114 inch dia.

D. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:

1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches o.c.
2. Install additional hangers as may be indicated in the drawings or for ceiling grid attachments that may require additional support.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail. Install with a minimum of three tight turns within a 1 ½" length.
4. Do not attach hangers to steel roof deck.
5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Texture finishes.

B. Related Requirements:

1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
2. Section 092216 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.
3. Section 093000 "Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
2. Textured Finishes: 12”x12” minimum for each textured finish indicated and on same backing indicated for Work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATION

A. **For each of the Products listed below, each must come from a single approved manufacturer. Mixing of different manufacturer's similar products on the project is not acceptable.**

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

B. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Core: 5/8 inch, Type X.
2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Thickness: 5/8 inch.
2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:

a. Cornerbead.
b. Expansion (control) joint.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
3. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

2.9 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.

1. Texture: Orange Peel unless noted otherwise or if matching existing adjacent finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

A. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, **including floor slabs**. Provide **1/8- to 1/4-inch**- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

B. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

C. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

D. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

E. Fire-Rated Assemblies: Where Fire-Rated Assemblies are identified, provide all construction in accordance with UL listed assembly components and requirements.
1. Install tape and joint compound at all joints in accordance with UL listed assembly.
2. Install Fire-Resistive Joint assemblies where wall assemblies abut adjacent surfaces or structure. Install in accordance with Section 078446 "Fire-Resistive Joint Systems".
3. Install Membrane Penetrations shall be installed per UL classifications CLIV or QCSN.
4. Install Though-Penetration Firestop Systems in accordance with Section 078413 "Penetration Fire stopping".
5. Install stenciling on all rated walls above accessible ceiling areas. Identification shall:
a. Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition
b. Include lettering not less than 3 inches in height with a minimum 3/8-inch stroke in a contrasting color incorporating the suggested working, "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS," or other wording.

F. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Vertical surfaces unless otherwise indicated.
2. Moisture- and Mold-Resistant Type: **All areas subject to moisture that are scheduled to have a painted finish including, but not limited to, all toilet room walls, all kitchen area walls, on all walls on which a sink or water fountain is located (within six feet either side of the fixture).**

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws .

D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and **install at locations indicated to receive tile other than at showers and tubs where required to be cementitious backer units**. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, **at showers, tubs, and where indicated**.

C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile or for acoustical tile.
3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved sample and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wall and Floor Tiles.
2. Thresholds.
3. Waterproof membrane.
4. Crack isolation membrane.

B. Related Sections:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for cementitious backer units and glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.5.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds in 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

1.6 MATERIALS MAINTENANCE SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Thresholds.
2. Membranes.
3. Joint sealants.
4. Cementitious backer units.

D. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in swimming pools on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Products: Refer to Finish and Materials Schedule in Section 099999 for selections. No substitutes.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503/C53M, with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241/C241M and with honed finish.

1. Description: In the absence of a scheduled product in the Finish and Materials Schedule or on the Drawings, provide uniform, fine- to medium-grained white stone with gray veining. Otherwise, provide scheduled product.

C. Metal Thresholds: Provided materials in finishes as scheduled or matching the finish of other adjacent trim/hardware.

1. Transitions: Provided in profiles appropriate to adjacent material types and finishes.

2. Shower Perimeter: Provide two-part profile with aluminum support profile, in appropriate size and shape for adjacent flooring materials, set flush with adjacent flooring and a collapsible, straight lip PVC insert.
   a. Provide additional half-round, replaceable insert in same lengths. Deliver this trim to Owner along with other overstock materials.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

2.5 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

2.6 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.7 GROUT MATERIALS

A. Polymer modified Cement Grout: ANSI A118.7

1. For grout joints from 1/16” – 1/8” use unsanded grout
2. For grout joints from 1/8” – 1/2” use sanded grout

B. 100% Solid Epoxy Grout: ANSI 118.3.

1. Use Epoxy Grout for all floor tiles, unless noted otherwise, and at walls and floors in showers stalls and tubs.
2. Compressive Strength: 5,000 psi min.
3. Tensile Strength: 1,500 psi min.
4. Thermal Shock Resistance: 800 psi min.

2.8 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 079200 "Joint Sealants."

1. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

E. Chemical-Resistant Sealants: For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout.

2.9 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

    a. Exterior tile floors.
    b. Tile floors in wet areas.
    c. Tile swimming pool decks.
    d. Tile floors in laundries.
    e. Tile floors composed of tiles 8 by 8 inches or larger.
    f. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths. For other installations not listed, install in accordance with Manufacturer's recommended joint width.

1. Ceramic Mosaic Tile: 1/16 inch.
2. Quarry Tile: 1/4 inch.
3. Paver Tile: 1/4 inch.
4. Glazed Wall Tile: 1/8 inch.
5. Decorative Thin Wall Tile: 1/16 inch.

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

J. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

C. [Delete This – Make this line Bold]Unless noted otherwise, install waterproofing membrane at all shower stalls. Extend shower pan up 6" on surrounding walls.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093000

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.9 MATERIALS MAINTENANCE SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. **Acoustical Ceiling Tiles: Furnish full-size, unused materials equal to 5% of amount installed. The materials are to be delivered to location as directed by Owner and the Contractor is to provide written documentation evidencing the amount of material required for the project and the amount of product delivered as extra material.**

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANELS, GENERAL

A. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
2. Suspension System: Obtain each type from single source from single manufacturer.

B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

C. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.

D. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.

E. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL PANELS

A. Manufacturers: **Unless a substitution is otherwise permitted, with written approval from the Architect obtained prior to bidding, provide the manufacturer and product named in the Finish Schedule.**

B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:

1. Type and Form: Type III, mineral base with painted finish.

C. Colors and Patterns: **Refer to Finish and Materials Schedule in Section 099999 for selections.**

D. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
b. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
c. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
4. Size: Select wire diameter so its stress at five times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire (12 GA).
5. **Utilize continuous lengths without kinks or splices.**

D. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

2.5 METAL SUSPENSION SYSTEM

A. Manufacturers: **Subject to compliance with requirements, provide suspension systems by the same manufacturer as the acoustic panels**.

B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) type.
3. Face Design: Flat, flush.
4. Cap Material: Steel cold-rolled sheet.
5. Cap Finish: Painted white unless otherwise scheduled.

C. Flexible PVC wall angle at designed curved wall surfaces.

1. Basis-of-design product: Flex-Grid Angle by Trim-Tex Drywall Products.
2. Rigid PVC wall attachment angle with Flexible PVC leg to adjust to wall curve.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where requiredto miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
11. **Do not splice hanger wires. System is to be supported by only individually continuous wires.**

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange directionally patterned acoustical panels as follows:

a. As indicated on reflected ceiling plans.
b. Install panels with pattern running in one direction parallel to long axis of space.
c. Install panels in a basket-weave pattern.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install hold-down clips in areas indicated, **within 20 feet of any exterior doorways,** in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.

G. For any ceiling tiles that are to have devices installed in/on/through the tile, i.e. fire sprinkler heads, speakers, fire alarm strobes, smoke detectors, etc. Install the devices in the center of the full tile nearest the location indicated on the Drawings.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Resilient base.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Coordinate mockups in this Section with mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

A. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

B. Thickness: 0.125 inch.

C. Height: As scheduled.

D. Lengths: **Coils in manufacturer's standard length**.

E. Outside Corners: Job formed or preformed.

F. Inside Corners: Job formed or preformed.

G. Colors: **Refer to Finish and Materials Schedule in Section 099999 for selections. No substitutes**.

2.2 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level.

C. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

a. Miter corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Tightly adhere to substrates throughout length of each piece.
2. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes vinyl and rubber sheet flooring.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of flooring. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

C. Samples: For each exposed product and for each color and texture specified in manufacturer's standard size, but not less than 6-by-9-inch sections.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

D. Samples for Initial Selection: For each type of resilient sheet flooring indicated.

E. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch sections of each different color and pattern of resilient sheet flooring required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

F. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.

G. Product Schedule: For resilient sheet flooring. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor covering manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive resilient sheet flooring during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during resilient sheet flooring installation.

D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.

E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL SHEET FLOORING

A. Product Standard: ASTM F 1913.

B. Sheet Width: As standard with manufacturer.

C. Seamless-Installation Method: Heat welded.

D. Colors and Patterns**: Refer to Finish and Materials Schedule in Section 099999 for selections. No substitutes.**

2.3 RUBBER SHEET FLOORING

A. Product Standard: ASTM F 1859.

1. Type: Type I (homogeneous rubber sheet).
2. Thickness: As standard with manufacturer.
3. Hardness: Not less than required by ASTM F 1859.

B. Wearing Surface: Smooth.

C. Sheet Width: As standard with manufacturer.

D. Seamless-Installation Method: Heat welded.

E. Colors and Patterns: **Refer to Finish and Materials Schedule in Section 099999 for selections. No substitutes.**

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.

C. Seamless-Installation Accessories:

1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.

a. Color: Match flooring unless scheduled otherwise.

2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

a. Bonding compound shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Integral-Flash-Cove-Base Accessories:

1. Cove Strip: 1-inch radius provided or approved by resilient sheet flooring manufacturer.
2. Cap Strip: Square metal cap provided or approved by resilient sheet flooring manufacturer.

E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer or listed in this Section.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient sheet flooring manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient sheet flooring until it is the same temperature as the space where it is to be installed.

1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.

C. Lay out resilient sheet flooring as follows:

1. Maintain uniformity of flooring direction.
2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
3. Match edges of flooring for color shading at seams.
4. Avoid cross seams.

D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:

1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless flooring. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

J. Integral-Flash-Cove Base: Cove resilient sheet flooring 6 inches up vertical surfaces unless noted otherwise. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.

B. Perform the following operations immediately after completing resilient sheet flooring installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.

1. Apply five coats.

E. The following are steps in preparing a new hard surface floor to be stripped and waxed.

1. Sweep newly installed floor removing all debris.
2. Apply manufacturer approved stripping solution to flooring.
3. Use buffer with scrubbing pad to remove factory/manufacturer finish.
4. Thoroughly wet-vac stripping solution and rinse with clean water ensuring all stripping solution and factory/manufacturer finish is removed.
5. Once flooring is thoroughly cleaned, apply two (2) coats of Johnson's Over and Under Floor Sealer or Airkam's Padlock Sealer. Let sealer dry between coats.
6. After sealer is applied and dried, apply three (3) coats of Johnson's Vectra Floor Finish or Airkam's Grand Entrance floor finish. Let finish dry between coats.

F. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes modular carpet tile.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for removing existing floor coverings.
2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.
3. Section 096816 "Sheet Carpeting."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. **Materials are to be delivered to location as directed by the Owner. The Contractor is to provide written documentation evidencing the amount of material required for the project and the amount of product delivered as extra material.**

1. Carpet Tile: Full-size units equal to 6 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.7 QUALITY ASSURANCE

A. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.9 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. **Products: Refer to Finish and Materials Schedule in Section 099999 for selections. No substitutes**.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

C. Transition Strips: Unless otherwise scheduled or indicated on the Drawings, provide resilient material transition strip of profile and width required, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

B. Related Requirements:

1. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
2. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

A. Gloss Level 3 (eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 5 (semi-gloss): 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. Colors: **Refer to Finish and Materials Schedule in Section 099999**.

2.2 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4.

2.3 PRIMERS/SEALERS

A. Primer Sealer, Interior, Institutional Low Odor/VOC: MPI #149.

B. Primer Sealer, Alkyd, Interior: MPI #45.

C. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.4 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.

B. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

C. Primer, Galvanized, Water Based: MPI #134.

2.5 WATER-BASED PAINTS

A. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 3): MPI #145.

B. Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (Gloss Level 5): MPI #147.

2.6 SOLVENT-BASED PAINTS

A. Alkyd, Interior, Semi-Gloss (Gloss Level 5): MPI #47.

2.7 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Pipe hangers and supports.
d. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Uninsulated metal piping.
b. Pipe hangers and supports.
c. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
d. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 3), MPI #145.

B. Steel Substrates:

1. Alkyd System:

a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79 or primer, alkyd, quick dry, for metal, MPI #76.
b. Intermediate Coat: Alkyd, interior, matching topcoat.
c. Topcoat: Alkyd, interior, (Gloss Level 3), MPI #51.

C. Galvanized-Metal Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, galvanized, water based, MPI #134.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 3), MPI #145.

D. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 3), MPI #145.

END OF SECTION 099123

ORIGINAL ISSUE

SECTION 099999 – MATERIAL AND FINISH SCHEDULES

PART 1 - GENERAL

1.1 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.2 GENERAL

A. This section covers the interior products, finishes and materials that are exposed to view in the finished construction. The specified manufacturer is based on performance standards and aesthetic qualities of products. All products are specified for appropriateness of application related to project criteria, as well as, structural integrity. The word “color” as used herein includes surface color, pattern and texture. Requirements for additional quality standards and method of installation are covered in other appropriate sections of the specifications. When required for clarification, specific material locations are shown on the drawings. Finish items not designated in this section may be specified in other sections. When material or color is not designated for an item, the contractor shall provide manufacturer’s standard color charts for selection and approval.

PART 2 - PRODUCTS

2.1 REFERENCE TO MANUFACTURER’S MATERIALS AND COLORS

A. Where material is shown as being specific to one manufacturer, an equivalent by another manufacturer that meets or exceeds the performance and aesthetic specifications may be submitted for review and approval. Manufacturers and materials specified are not intended to limit the selection of equal materials and products from other manufacturers. It is the responsibility of the subcontractor to provide all pertinent manufacturers’ information proving the substituted material meets or exceeds the specified material.

2.2 MATERIAL AND FINISH SCHEDULES

A. See attached Material and Finish Schedules as developed by Condray Design Group. All finish materials are to be as scheduled. No substitutions allowed without prior approval.

PART 3 - EXECUTION

(NOT APPLICABLE)

END OF SECTION

	MATERIAL SCHEDULE	ORIGINAL ISSUE
Material	**Code**	**Manufacturer's Description**
Wall Finishes		
Paint	P1	PPG 1007-1 Willow Springs (ceiling & field color in Pharmacy), Epoxy Paint - unless noted otherwise
	P2	PPG 1008-2 Storm's Coming (field color); Epoxy Paint - unless noted otherwise
	P3	PPG 1025-4 Sharkskin (dark neutral accent); Epoxy Paint - unless noted otherwise
	P4	PPG 1097-3 Toasted Almond (light neutral field color in Corridors) to match existing, adjacent walls - unless noted otherwise.
Wall Base	WB1	Roppe, Traditional 4"H Rubber Wall Base, continuous coiled lengths; Color: 179 Steel
Wall Protection	WP1	Koroseal; Koroguard Traffic Patterns; Pattern: Kimono II; Color: Cloud K722-01; .060" thickness (trim color to be InPro Feather 0238). Include outside corner trim pieces for a complete installation.
Fiber Reinforced Panel	FRP1	Marlite, Standard FRP, Pebbled Surface; 3/32" thick; Color: 140 Ivory; Include trim pieces for a complete install.
Trim Cap	TC1	Inpro; Palladium notched trim cap, notched for .060" thick material; Color: Pebble Gray #0387 (to be installed where WP1 is used, unless noted otherwise); 2"H; Mitered corners; Do not puncture material with nails, unless noted otherwise.
Flooring Finishes		
Sheet Vinyl	SV1	Mannington, Biospec MD, Alpaca 15517, .080" Thickness (light neutral field); Use largest width available to minimize seams; Weld rod color: 842354 Beige
	SV2	Mannington, Biospec MD, Ecru 15362, .080" Thickness (dark neutral accent); Use largest width available to minimize seams; Weld rod color: 842405 Ecru
	SV3	Mannington, Realities II, Maple Grove II, Pine 5627R, .080" Thickness (wood look); Use largest width available to minimize seams; Weld rod color: 842501 Woodstown
	SV4	Mannington, Paradigm II, Intersect, Origin PD110, .080" Thickness (hatch pattern); Use largest width available to minimize seams; Weld rod color: 842485 Bone Beige
	SV5	Mannington, Biospec MD, Cherry Tomato 15508, .080" Thickness (redline flooring); Wels rod color: 842510 Scarlet.
Vinyl Composition Tile	VCT1	Armstrong, Imperial Texture Standard Excelon, Vinyl Composition Tile; size 12"x12"x1/8"; Color: Fortress White 51839; Quarter-turn install to match existing corridor VCT tile.

	MATERIAL SCHEDULE	ORIGINAL ISSUE
Material	**Code**	**Manufacturer's Description**
Door and Millwork Finishes		
Plastic Laminate	PL1	Wilsonart, Palisades Oak 7987-38; fine velvet finish (vertical millwork & door finish, unless noted otherwise)
	PL2	Wilsonart, Montana Walnut 7110K-78; fine grain finish (TTUHSC finish for Corridor doors, unless noted otherwise.)
Solid Surface Material	SSM1	Wilsonart, Beige Travertine 9236SS (horizontal millwork work surfaces and window sills)
Miscellaneous Finishes		
Accoustic Ceiling Panel	ACP1	USG, Olympia Micro Acoustical Panels, ClimaPlus, White, 24" x 24" x 5/8"
Metal Lockers	MTL1	Republic Storage, Metal Lockers, Sloped Top and Continuous Base; Color 69 Monorail Gray
Transition Strip	TS1	Johnsonite Slim Line Transitions; Profile SLT-179-B; .080" to 1/8" material; Color 179 Steel

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
				First Floor					
BAL 110	Intake/Receiving	SV1	WB1	ACP1	P1 FRP1	P1	P1	P1 FRP1	**WALLS:** FRP1 to be installed from 1/2" behind WB1 to 86" above finished floor on North and West walls. Refer to ID Sheets.
BAL 110A	Distribution	SV1	WB1	ACP1	P1	P1	P1	P1	**WALLS:** Provide smooth transition where new construction intersects with existing conditions to remain. Refer to ID Sheets. **FLOOR:** Provide smooth transition where new construction intersects with existing conditions to remain. Refer to ID Sheets. **MILLWORK:** SSM1 on countertops; PL1 on all vertical surfaces. Refer to Millwork Elevations.
BAL 100B	Inventory / Purchasing	SV3	WB1	ACP1	P2	P2	P2	P3	
BAL 100C	Ante Room	-	-	-	-	-	-	-	No work in this location.
BAL 100D	Clean Hood Room	-	-	-	-	-	-	-	No work in this location.
BAL 100E	Oral Compounding Work Area	SV1 SV2	WB1	ACP1	P1	P1	P1	P1	FLOOR: Refer to ID Sheets for Floor Pattern. MILLWORK: SSM1 on countertops and splashes, and on face & top of transaction counter; PL1 on all other vertical surfaces. Refer to Millwork Elevations.
BAL 100F	Work Area	SV1 SV5	WB1	ACP1	P1	P1	P1	P1	**FLOOR:** Refer to ID Sheets for Redline (SV5) location. **MILLWORK:** SSM1 on countertops, splashes, and on face & top of transaction counter; PL1 on all other vertical surfaces. Refer to Millwork Elevations.

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	**Description**	**Floor**	**Base**	**Ceiling**	**North**	**East**	**South**	**West**	**Remarks**
BAL 100G	Work Area	SV1	WB1	ACP1	P1	P1	P1	P1	**WALLS:** Paint P4 to go on on Corridor side of wall infill to match existing paint in corridor. Provide smooth transition where new wall intersects with existing conditions. **MILLWORK:** SSM1 on countertops, splashes, and on face & top of transaction counter; PL1 on all other vertical surfaces. Refer to Millwork Elevations.
BAL 100H	Pharmacist Work Area	SV1	WB1	ACP1	-	P1	P1	P1	**MILLWORK:** SSM1 on countertops and splashes, and on face & top of transaction counter; PL1 on all other vertical surfaces. Refer to Millwork Elevations.
BAL 100HA	Inpatient Manager	SV3	WB1	ACP1	P3	P2	P2	P2	
BAL 110J	Narcotics	SV1	WB1	ACP1	P1	P1	P1	P1	**MILLWORK:** SSM1 on countertop and splash; PL1 on all vertical surfaces. Refer to Millwork Elevations.
BAL 110K	Will Call	SV1	WB1	ACP1	P1	P1	P1	P1	**MILLWORK:** SSM1 on countertops and splashes; PL1 on all vertical surfaces. Refer to Millwork Elevations and Details.
BAL 110KA	Storage	SV1	WB1	ACP1	P1	P1	P1	P1	

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
BAL 110KB	Break Room	SV1	WB1	ACP1	P2	P2	P2	P2	**CEILING:** Tie new corridor ceiling grid into existing grid to remain. **WALLS:** Refer to ID Sheets for Metal Locker ML1 locations. Paint P4 to go on corridor-side of new walls to match existing paint in corridor. Provide smooth transition where new wall intersects with existing conditions. **FLOORING:** Provide smooth transition in corridor where new VCT1 intersects with existing conditions. **MILLWORK:** SSM1 on countertops and splashes; PL1 on all vertical surfaces; PL2 on South door (into corridor). Refer to Millwork Elevations.
001	Entry	SV3 SV4	WB1	ACP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	P3 TC1 WP1	**FLOOR:** Refer to ID Sheets for floor pattern. **WALLS:** WP1 to be installed from 1/2" behind wall base to TC1. Wall protection to be installed with 1/8" gap at seams and sealed with color-matched caulk to allow for movement. TC1 to top out at 42" above finished floor.
002	Conference Room	SV3	WB1	ACP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	**WALLS:** WP1 to be installed from 1/2" behind wall base to TC1. Wall protection to be installed with 1/8" gap at seams and sealed with color-matched caulk to allow for movement. TC1 to top out at 34" above finished floor.
003	Office	SV3	WB1	ACP1	P2	P2	P3	P2	
004	Admin Assistant	SV3	WB1	ACP1	P2	P3	P2	P2	
005	Director Office	SV3	WB1	ACP1	P3	P2	P2	P2	

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
006	Dialysis	SV1	WB1	ACP1	P2	P2	P2	P2	
007	Hallway	SV3	WB1	ACP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	**WALLS:** WP1 to be installed from 1/2" behind wall base to TC1. Wall protection to be installed with 1/8" gap at seams and sealed with color-matched caulk to allow for movement. TC1 to top out at 42" above finished floor.
008	Pharmacy Offices	SV3	WB1	ACP1	P2	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splash; PL1 on all vertical surfaces. Refer to Millwork Elevations.
009	Office	SV3	WB1	ACP1	P2	P2	P3	P2	
010	Corridor	-	-	-	-	-	-	-	No work in this location.

General Notes:	
1	Refer to project manual and drawings for additional information. Should there be any discrepancies between the documents, such discrepancies are to be brought to the attention of the architect through a written RFI and then the contractor shall receive instruction prior to installation or performance of said work. Work performed in conflict with the drawings or schedule shall be corrected by the contractor at their own expense.
2	No substitutions will be accepted without prior written approval.
3	All work to be performed according to manufacturer's recommended methods.
4	Comply with manufacturer's recommendations for examination, testing, and preparation of substrate material (including subfloors) prior to installation. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
5	Refer to specifications for indications regarding epoxy paint.
6	All wall base to be applied in full continuous lengths.
7	Wall base to wrap all millwork connections to floor (including end panels) as scheduled.
8	Integral wall base to match scheduled flooring unless noted otherwise. Flash cove with cove strip to 6" A.F.F. and cap with metal trim. Outside corners of trim cap to be smoothed or rounded.
9	A pre-installation meeting with the architect is required prior to the installation of tile, vinyl flooring, wall protective products, and materials where patterns are used.
10	All exposed corners and edges of wainscot material to be finished.
11	Install chair rail at heights determined per Architectural Elevations. Terminate at edge of wall faces with mitered returns. Do not wrap to window frames.

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
12	Install corner guards on all outside corners (unless noted otherwise) from top of base in full lengths or to underside of chair rail or trim cap where present.								
13	Blinds/roller shades and window sills to be installed at all windows in scope of work unless noted otherwise.								
14	Ensure that wall finishes do not prevent the operation of roller shades or window blinds and that shade material extends completely to window frames.								
15	Chair rails, hand rails, and trim caps to extend as close to corners, edges, and door frames as possible without overextending.								
16	Install all flooring material to wall under open millwork.								
17	Ensure that millwork countertop seams are level, even, and align with support brackets.								
18	Sheet vinyl to be installed in largest widths to minimize seams, especially in corridors and hallways.								
19	Include transition strips or leveling systems between different flooring types as scheduled.								
20	Use manufacturer recommended weld rod colors for sheet vinyl welds.								
21	Provide clean, smooth transitions between existing and new finishes.								
22	Comply with specified cleaning and protection requirements at completion of installation.								
23	All door frames in scope of work, including existing frames, to be painted P2 unless noted otherwise.								
24	PPG is the facility standard paint manufacturer. Substitutions are not acceptable.								
25	WP1 to begin at approximately 1/2" below top of rubber base without a trim piece or at top of sanitary or integral base with trim piece at edge.								

SECTION 099999 – MATERIAL AND FINISH SCHEDULES

PART 1 - GENERAL

1.1 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.2 GENERAL

A. This section covers the interior products, finishes and materials that are exposed to view in the finished construction. The specified manufacturer is based on performance standards and aesthetic qualities of products. All products are specified for appropriateness of application related to project criteria, as well as, structural integrity. The word “color” as used herein includes surface color, pattern and texture. Requirements for additional quality standards and method of installation are covered in other appropriate sections of the specifications. When required for clarification, specific material locations are shown on the drawings. Finish items not designated in this section may be specified in other sections. When material or color is not designated for an item, the contractor shall provide manufacturer’s standard color charts for selection and approval.

PART 2 - PRODUCTS

2.1 REFERENCE TO MANUFACTURER’S MATERIALS AND COLORS

A. Where material is shown as being specific to one manufacturer, an equivalent by another manufacturer that meets or exceeds the performance and aesthetic specifications may be submitted for review and approval. Manufacturers and materials specified are not intended to limit the selection of equal materials and products from other manufacturers. It is the responsibility of the subcontractor to provide all pertinent manufacturers’ information proving the substituted material meets or exceeds the specified material.

2.2 MATERIAL AND FINISH SCHEDULES

A. See attached Material and Finish Schedules as developed by Condray Design Group. All finish materials are to be as scheduled. No substitutions allowed without prior approval.

PART 3 - EXECUTION

(NOT APPLICABLE)

END OF SECTION

	MATERIAL SCHEDULE	ORIGINAL ISSUE
Material	**Code**	**Manufacturer's Description**
Wall Finishes		
Paint	P1	PPG 1007-1 Willow Springs (ceiling & light field color), Epoxy Paint - unless noted otherwise.
	P2	PPG 1008-2 Storm's Coming (field color); Epoxy Paint - unless noted otherwise.
	P3	PPG 1025-4 Sharkskin (neutral accent, doorframes and trim, unless noted otherwise); Epoxy Paint - unless noted otherwise.
	P4	PPG 1097-3 Toasted Almond (light neutral); walls in Hallway 104 to matching existing, adjacent walls - unless noted otherwise.
	P5	PPG 1097-4 Dusty Trail (medium neutral accent); chair rail in Hallway 104 to match existing, adjacent chair rail - unless noted otherwise.
Wall Base	WB1	InPro, Stainless Steel Wall Base, Coved, 6"H. Include pre-formed inside and outside corners as needed.
	WB2	Johnsonite/Tarkett, Traditional Wall Base, 4"H, continuous coiled lengths; Color: 179 Steel
	WB3	Roppe, Traditional 4"H Rubber Wall Base, continuous coiled lengths; Color: 140 Fawn
Flash Cove	FC1	Base to match adjacent material, flash cove to 6”H, cap with J-mold
Ceiling Cove	CC1	Trim-Tex, 1 1/2" R. Bullnose Inside Corner Bead
Chair Rail	CR1	UMC Standard Paintable Wood Chair Rail, profile to match existing; Paint with P5 to match existing chair rail.
Wall Panel System	WPS1	Panel Specialists Inc., PSI System 310 with Formica, Pearl 934-58, Matte Finish, Grade 32 plastic laminated panels on MDF with .018" (.5mm) EB Reveal, edge-banding in platinum. PSI Trims: Vertical Reveal #302A in clear anodized aluminum; Horizontal bottom edge trim #604 in clear anodized aluminum; Vertical Edge trim #604A in clear anodized aluminum; Top Trim #604A in clear anodized aluminum; 90 Degree outside corner trim #603-90 in clear anodized aluminum. Contact: Al Skrabanek, al.skrabanek@panelspec.com, 254-742-9062
	WPS2	Panel Specialists Inc., PSI System 310 with Wilsonart, Bronze Legacy 4656-60, Matte Finish, Grade 32 plastic laminated panels on MDF with .018" (.5mm) EB Reveal, edge-banding in platinum. PSI Trims: Vertical Reveal #302A in black finish; Horizontal bottom edge trim #604 in black finish; Vertical Edge trim #604A in black finish; Top Trim #604A in black finish; 90 Degree outside corner trim #603-90 in black finish. Installed at same height as existing adjacent panels. Contact: Al Skrabanek, al.skrabanek@panelspec.com, 254-742-9062

	MATERIAL SCHEDULE	ORIGINAL ISSUE
Material	**Code**	**Manufacturer's Description**
Trim Cap	TC1	Panel Specialists Inc., PSI System 310 Perimeter Trim, 404WC Wainscot Chair Rain Top Trim with 412RI Insert, Finish: Clear Anodized Aluminum. Install at 42"H, unless noted otherwise.
Flooring Finishes		
Sheet Vinyl	SV1	Mannington, Biospec MD, Alpaca 15517, .080" Thickness (light neutral field); Use largest width available to minimize seams; Weld rod color: 842354 Beige.
	SV2	Mannington, Biospec MD, Horizon Blue 15378,.080" Thickness (light blue field); Use largest width available to minimize seams; Weld rod color: 842409 Horizon Blue.
	SV3	Mannington, Biospec MD, Twilight Twinkle 15433,.080" Thickness (dark blue); Use largest width available to minimize seams; Weld rod color: 842515 Liberty.
Door and Millwork Finishes		
Plastic Laminate	PL1	Wilsonart, Palisades Oak 7987-38; fine velvet finish (vertical millwork & door finish, unless noted otherwise)
Solid Surface Material	SSM1	Wilsonart, Beige Travertine 9236SS (horizontal millwork and window sills)
Miscellaneous Finishes		
Transition Strip	TS1	Johnsonite Slim Line Transitions; Profile SLT-179-B; .080" to 1/8" material; Color 179 Steel
Roller Shade	RS1	Equal to Draper, manual shade, square fascia, Mermet S Screen Origins light-filtering fabric, 4% percent openness, color Granite

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
First Floor									
100	Hallway	-	WB1	-	P1 TC1 WPS1	P1 TC1 WPS1	P1 TC1 WPS1	P1 TC1 WPS1	**WALLS:** WPS1 (PSI Panel System) to be installed from top of WB1 to bottom of TC1. Top of TC1 to be installed at 42" Above Finished Floor. Refer to ID Sheets.
101	Pharmacy	SV1	WB2	P1	P2	P2	P2	P2	**WALLS:** Window sills to be SSM1. RS1 to be installed across windows on South wall. **MILLWORK:** SSM1 on horizontal surfaces; PL1 on all vertical surfaces. Refer to Millwork Elevations.
102	Ante-Room	SV1 SV2 SV3	FC1	P1	P1	P1	P1	P1	**FLOORS:** Refer to ID Sheets for floor pattern
103	I.V. Hood Room	SV2	FC1	P1	P1	P1	P1	P1	
104	Hallway	-	WB3	-	-	-	P4 CR1 WPS2	-	**WALLS:** At door infill on South wall, WPS2 (PSI Panel System) to be installed from top of WB3 to bottom of CR1. Align WPS2 and CR1 with adjacent, existing-to-remain wall panels and chair rail.

General Notes:	
1	Refer to specification manual and drawings for additional information. Should there be any discrepancies between the documents, such discrepancies are to be brought to the attention of the architect through a written RFI and then the contractor shall receive instruction prior to installation or performance of said work. Work performed in conflict with the drawings or schedule shall be corrected by the contractor at their own expense.
2	No substitutions will be accepted without prior written approval.
3	All work to be performed according to manufacturer's recommended methods.
4	Comply with manufacturer's recommendations for examination, testing, and preparation of substrate material (including subfloors) prior to installation. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
5	Comply with lighting, environmental, and other requirements specified in individual specification sections.
6	On all walls scheduled to remain, patch any existing holes, cracks, or otherwise damaged areas and retexture and prep to receive new specified finish(es).
7	Refer to specifications for indications regarding epoxy paint.
8	All wall base to be applied in full continuous lengths.

	FINISH SCHEDULE								ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
9	Wall base to wrap all millwork connections to floor (including end panels) as scheduled.								
10	All inside/outside corners (and terminations if not intersecting a material of greater thickness) of profile wall base to be cleanly mitered.								
11	Integral wall base to match scheduled flooring unless noted otherwise. Flash cove with cove strip to 6" A.F.F. and cap with metal trim. Outside corners of trim cap to be smoothed or rounded.								
12	A pre-installation meeting with the architect is required prior to the installation of tile, vinyl flooring, wall protective products, and materials where patterns are used.								
13	All exposed corners and edges of wainscot material to be finished.								
14	Install chair rail at heights determined per Architectural Elevations. Terminate at edge of wall faces with mitered returns. Do not wrap to window frames.								
15	Chair rails, hand rails, and trim caps to extend as close to corners, edges, and door frames as possible without overextending.								
16	Install all flooring material to wall under open millwork.								
17	Sheet vinyl to be installed in largest widths to minmize seams, especially in corridors and hallways.								
18	Include transition strips or leveling systems between different flooring types as scheduled.								
19	Use manufacturer recommened weld rod colors for sheet vinyl heat welds.								
20	Provide clean, smooth transitions between existing and new finishes.								
21	Comply with specified cleaning and protection requirements at completion of installation.								
22	All gypsum ceilings to be painted P1 unless noted otherwise.								
23	All door frames in scope of work, including existing frames, to be painted P3 unless noted otherwise.								
24	PPG is the facility standard paint manufacturer. Substitutions are not acceptable.								
25	WP1 to begin at approximately 1/2" below top of rubber base without a trim piece or at top of sanitary or integral base with trim piece at edge.								
26	Install corner guards on all outside corners (unless noted otherwise) from top of base in full lengths or to underside of chair rail or trim cap, where present.								
27	Blinds/roller shades and window sills to be installed at all windows in scope of work unless noted otherwise.								
28	Ensure that wall finishes do not prevent the operation of roller shades or window blinds and that shade material extends completely to window frames.								
29	Ensure that millwork countertop seams are level, even, and align with support brackets.								

SECTION 099999 – MATERIAL AND FINISH SCHEDULES

PART 1 - GENERAL

1.1 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.2 GENERAL

A. This section covers the interior products, finishes and materials that are exposed to view in the finished construction. The specified manufacturer is based on performance standards and aesthetic qualities of products. All products are specified for appropriateness of application related to project criteria, as well as, structural integrity. The word “color” as used herein includes surface color, pattern and texture. Requirements for additional quality standards and method of installation are covered in other appropriate sections of the specifications. When required for clarification, specific material locations are shown on the drawings. Finish items not designated in this section may be specified in other sections. When material or color is not designated for an item, the contractor shall provide manufacturer’s standard color charts for selection and approval.

PART 2 - PRODUCTS

2.1 REFERENCE TO MANUFACTURER’S MATERIALS AND COLORS

A. Where material is shown as being specific to one manufacturer, an equivalent by another manufacturer that meets or exceeds the performance and aesthetic specifications may be submitted for review and approval. Manufacturers and materials specified are not intended to limit the selection of equal materials and products from other manufacturers. It is the responsibility of the subcontractor to provide all pertinent manufacturers’ information proving the substituted material meets or exceeds the specified material.

2.2 MATERIAL AND FINISH SCHEDULES

A. See attached Material and Finish Schedules as developed by Condray Design Group. All finish materials are to be as scheduled. No substitutions allowed without prior approval.

PART 3 - EXECUTION

(NOT APPLICABLE)

END OF SECTION

	MATERIAL SCHEDULE	ORIGINAL ISSUE
Material	**Code**	**Manufacturer's Description**
Wall Finishes		
Paint	P1	PPG, 1006-1 Gypsum (white color)
	P2	PPG, 1008-2 Storm's Coming (light neutral field color)
	P3	PPG, 1008-6 Artillery (dark neutral accent color)
Wall Base	WB1	Johnsonite/Tarkett, Traditional Wall Base, 179 Steel, 4"H, continuous coiled lengths
	WB2	Johnsonite/Tarkett, Millwork Wall Base, MW-179-F Reveal Profile, 179 Steel, 4-1/4"H, continuous lengths
Flash Cove	FC1	Base to match adjacent material, flash cove to 6"H, cap with J-mold trim.
Wall Tile	WT1	Daltile, Fabrique, P686 Cream Linen, Matte, 12" x 24" x 3/8", straight grid horizontal installation (1/8" grout)
	WT2	Somer Tile; Aster Hex, Blanco, 8-5/8"x9-7/8", installation pattern to be coordinated with Interior Designer (1/8" grout)
Decorative Tile	DT1	American Olean, Color Appeal, 5/8x random mosaic, C140 Mountain Morning Blend, 11-3/4" x 12-1/2" x 5/16" sheet cut into 6" strips (to be used in single patient/staff toilets)
Fiber Reinforced Panel	FRP1	Marlite, Standard FRP, pebbled Surface, 140 Ivory, 3/32" thickness (include trim pieces for a complete installation)
Wall Vinyl	WV1	MDC, Natural Textiles 3, Fassett, Arctic MNN1232
Wall Protection	WP1	InPro, Ricochet, Pattern: Strata, Color: Mesmerized; RC-STR-R611, (trim color to be InPro, Pebble Gray #0387)
Trim Cap	TC1	InPro, Palladium, Notched Trim Cap, notched top cap for 0.032" thickness, 2"H profile, color Pebble Gray #0387 (to be installed where WP1 is used, unless noted otherwise)
Corner Guard	CG1	InPro, adhesive mounted Rigid Vinyl Corner Guard, 3/4" wings, full height (stop corner guard at bottom of trim cap where applicable); color Pebble Gray #0387
Flooring Finishes		
Carpet	CPT1	Mohawk Group, Learn and Live Plank, Sabbatical GT433, Elective 558, 12" x 36", ashlar installation
Floor Tile	FT1	Marazzi, Creativo, Ivory Square CV40, 12" x 12" x 3/8", diagonal install (1/8" grout)
Sheet Vinyl	SV1	Mannington, Biospec MD, Alpaca 15517, .080" Thickness (light neutral field); Use largest width available to minimize seams; Weld rod color: 842354 Beige.
Door and Millwork Finishes		
Plastic Laminate	PL1	Wilsonart, Palisades Oak 9887-38, Fine Velvet finish (typical door and vertical millwork surfaces, unless noted otherwise)
Solid Surface Material	SSM1	Wilsonart, Beige Travertine, 9236SS (horizontal millwork and window sills)
Ceiling Finishes		

	MATERIAL SCHEDULE	ORIGINAL ISSUE
Material	**Code**	**Manufacturer's Description**
Accoustic Ceiling Panel	ACP1	Armstrong, Dune #1772, Square Lay-in ceiling panels, 24" x 24" x 5/8"; Use with ceiling grid 1772 where new grid is needed.
Gypsum Ceiling	GYP	Gypsum board ceilings to be painted P1 unless noted otherwise (epoxy paint as required)
Miscellaneous Finishes		
Grout	G1	Custom Building Products, #386 Oyster Gray (use with FT1) (use epoxy grout on floors as specified.)
	G2	Custom Building Products, #545 Bleached Wood (use with WT1, DT1)
	G3	Custom Building Products, #60 Charcoal (use with WT2)
Metal Trim	MT1	Schluter, QUADEC, AT Satin Nickel Anodized Aluminum, install along exposed edges and outside corners (include corner and connector pieces for a complete installation) (wall tile only)
Transition Strip	TS1	Jonhsonite, Slim Line Transition, 179 Steel SLT-179-C (for CPT transition to SV)
	TS2	Jonhsonite, Slim Line Transition, 179 Steel SLT-179-L (for CPT transition to Tile)
Shower Curtain	SC1	Inpro, Shield commercial shower curtain; Pattern: TBD; Color: TBD; manufacture without open mesh heading; manufacture curtains of one piece, sized to 10% wider than the shower opening, but no less than 12" extra fullness. Curtain to hang from shower rod to 1/2" above finished floor. Include 4-ounce nickel-plated grommets spaced 6" on-center. Top hem to be triple-turned hem; curtains are to be seamless when possible with sanitary "no scum" side and bottom edges. Contact: Wendy Hudlow; whudlow@inprocorp.com; 405-514-1729
Roller Shade	RS1	Equal to Draper, manual shade, square fascia, Mermet S Screen Origins light-filtering fabric, 4% percent openness, color Granite

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
First Floor									
011	Corridor	-	-	-	-	-	-	-	No work in this location.
012	On-Call 1	CPT1	WB2	ACP1	P3	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
013	Toilet	-	-	-	P1	P1	P1	P1 SC1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
014	On-Call 2	CPT1	WB2	ACP1	P2	P2	P3	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
015	On-Call 3	CPT1	WB2	ACP1	P3	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
016	Toilet	-	-	-	P1	P1	P1	P1 SC1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
017	Housekeeping	SV1	FC1	ACP1	P2 FRP1	P2 FRP1	P2 FRP1	P2 FRP1	**WALLS:** Install FRP1 from top of base to underside of existing shelf. Existing shelf plus drywall from top of FRP1 to ceiling to be painted P2.
018	On-Call 4	CPT1	WB2	ACP1	P3	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
019	Toilet	-	-	-	P1	P1	P1	P1 SC1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
020	On-Call 5	CPT1	WB2	ACP1	P2	P2	P3	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
021	On-Call 6	CPT1	WB2	ACP1	P2	P2	P2	P3	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
022	Toilet	-	-	-	P1	P1	P1 SC1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
023	On-Call 7	CPT1	WB2	ACP1	P2	P3	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
024	On-Call 8	CPT1	WB2	ACP1	P2	P2	P2	P3	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
025	Toilet	-	-	-	P1	P1	P1 SC1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
026	On-Call 9	CPT1	WB2	ACP1	P2	P3	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
027	On-Call 10	CPT1	WB2	ACP1	P2	P2	P2	P3	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
028	Toilet	-	-	-	P1	P1	P1 SC1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
029	Janitor	-	-	ACP1	P2	P2	P2	P2	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P2. **FLOOR:** Existing tile to remain.
030	On-Call 11	CPT1	WB2	ACP1	P2	P2	P2	P3	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
031	Toilet	-	-	-	P1	P1	P1 SC1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
032	On-Call 12	CPT1	WB2	ACP1	P2	P3	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
033	On-Call 13	CPT1	WB2	ACP1	P2	P3	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
034	Toilet	-	-	-	P1 SC1	P1	P1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
035	On-Call 14	CPT1	WB2	ACP1	P2	P2	P2	P3	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
036	On-Call 15	CPT1	WB2	ACP1	P2	P2	P3	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
037	Toilet	-	-	-	P1	P1 SC1	P1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
038	On-Call 16	CPT1	WB2	ACP1	P3	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
039	On-Call 17	CPT1	WB2	ACP1	P2	P2	P3	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
040	Toilet	-	-	-	P1	P1 SC1	P1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
041	On-Call 18	CPT1	WB2	ACP1	P3	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
042	On-Call 19	CPT1	WB2	ACP1	P3	P2	P2	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
043	Toilet	-	-	-	P1	P1	P1	P1 SC1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
044	On-Call 20	CPT1	WB2	ACP1	P2	P2	P3	P2	**MILLWORK:** SSM1 on countertop and splashes; PL1 on vertical surfaces. Refer to Millwork Elevations.
045	Office	CPT1	WB2	ACP1	P2	P2	P2	P3	
046	Toilet	-	-	-	P1	P1 SC1	P1	P1	**WALLS:** Existing tile to remain. Drywall above existing tile to be painted P1. **FLOOR:** Existing tile to remain.
047	Storage	SV1	WB1	ACP1	P2	P2	P2	P2	**WALLS:** Plug mold to remain; Existing shelf to remain and receive P2 paint.
048	Corridor	-	WB1	ACP1	P2 P3	P2	WV1	P2	**WALLS:** Refer to ID Sheets for wall finish locations. **FLOOR:** Existing flooring to remain
049	Corridor	-	WB1	ACP1	P2	P3	-	P2	**WALLS:** Refer to ID Sheets for wall finish locations. **FLOOR:** Existing flooring to remain
050	Office	-	-	-	-	-	-	-	**WALLS:** New door and new roller shade RS1 for this location. Door and window trim to be painted P2.
051	Exercise Room	-	WB1	ACP1	P2	P2	P2	P2	**FLOOR:** Existing flooring to remain.
052	Community Room	-	WB2	ACP1	P2 TC1 WP1	P2 TC1 WP1	P3 TC1 WP1	P2 TC1 WP1	**WALLS:** Refer to ID Sheets for wall finish locations. TC1 to be installed at 34" Above Finished Floor. Curved wall to receive full-height WP1. Install roller shade RS1 on side lite at door 052A. **FLOOR:** Existing flooring to remain. **MILLWORK:** SSM1 on countertops and splashes; PL1 on vertical surfaces. WT2 to be installed as backsplash; WT2 installation pattern to be coordinated with Interior Designer. Refer to Architectural Elevations.

		FINISH SCHEDULE							ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
053	Corridor	-	WB1	ACP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	P2 TC1 WP1	**WALLS:** Refer to ID Sheets for wall finish locations. **FLOOR:** Existing flooring to remain
054	Toilet	FT1	-	GYP P1	P1 WT1 DT1	P1 WT1 DT1	P1 WT1 DT1	P1 WT1 DT1	**WALLS:** Install WT1 from top of floor tile to approximately 78" above finished floor with DT1 as a 6" decorative band at 60" above finished floor. Paint P1 above tile. All outside corners and exposed edges of tile to be trimmed with MT1. Include corner and connector pieces.
055	Toilet	FT1	-	GYP P1	P1 WT1 DT1	P1 WT1 DT1	P1 WT1 DT1	P1 WT1 DT1	**WALLS:** Install WT1 from top of floor tile to approximately 78" above finished floor with DT1 as a 6" decorative band at 60" above finished floor. Paint P1 above tile. All outside corners and exposed edges of tile to be trimmed with MT1. Include corner and connector pieces.
056	Corridor	-	WB1	ACP1	P2	P2	-	P3	**WALLS:** Refer to ID Sheets for wall finish locations. **FLOOR:** Existing flooring to remain
057	Electrical Room	SV1	WB1	GYP P1	P2	P2	P2	P2	

General Notes:	
1	Refer to project manual and drawings for additional information. Should there be any discrepancies between the documents, such discrepancies are to be brought to the attention of the architect through a written RFI and then the contractor shall receive instruction prior to installation or performance of said work. Work performed in conflict with the drawings or schedule shall be corrected by the contractor at their own expense.
2	No substitutions will be accepted without prior written approval.
3	All work to be performed according to manufacturer's recommended methods.
4	Comply with manufacturer's recommendations for examination, testing, and preparation of substrate material (including subfloors) prior to installation. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
5	Comply with lighting, environmental, and other requirements specified in individual specification sections.
6	On all walls scheduled to remain, patch any existing holes, cracks, or otherwise damaged areas and retexture and prep to receive new specified finish.

	FINISH SCHEDULE								ORIGINAL ISSUE
					Walls				
Room	Description	Floor	Base	Ceiling	North	East	South	West	Remarks
7	All wall base to be applied in full continuous lengths.								
8	Wall base to wrap all millwork connections to floor (including end panels) as scheduled.								
9	All inside/outside corners (and terminations if not intersecting a material of greater thickness) of profile wall base to be cleanly mitered.								
10	Integral wall base to match scheduled flooring unless noted otherwise. Flash cove with cove strip to 6" A.F.F. and cap with metal trim. Outside corners of trim cap to be smoothed or rounded.								
11	A pre-installation meeting with the architect is required prior to the installation of tile, vinyl flooring, wall protective products, and materials where patterns are used.								
12	All exposed corners and edges of wainscot material to be finished.								
13	Include all trim, inside/outside corner, connector, and end cap pieces for complete installation of finishes.								
14	Wall tile in other restroom areas to be typically installed to approximately 78" AFF, unless noted otherwise (minimum installation height to be 54"AFF).								
15	All tiled surfaces to be centered in space or adjusted to avoid small cut tiles.								
16	All wall tile to be trimmed on outside corners and exposed edges with scheduled metal trim (especially where integral base is used).								
17	Unless cove base or metal cove strip is used, floor tile is to be installed prior to wall tile so that wall tile sits on top.								
18	Install corner guards on all outside corners (unless noted otherwise) from top of base in full lengths or to underside of chair rail or trim cap where present.								
19	Install door edge guards on all corridor and hallway doors. Cleanly install from bottom of door to underside of latching hardware.								
20	Ensure that wall finishes do not prevent the operation of roller shades or window blinds and that shade material extends completely to window frames.								
21	Chair rails, hand rails, and trim caps to extend as close to corners, edges, and door frames as possible without overextending.								
22	Install all flooring material to wall under open millwork.								
23	Ensure that millwork countertop seams are level, even, and align with support brackets.								
24	Include transition strips or leveling systems between different flooring types as scheduled.								
25	Use manufacturer recommended weld rod colors for sheet vinyl heat welds.								
26	Provide clean, smooth transitions between existing and new finishes.								
27	Comply with specified cleaning and protection requirements at completion of installation.								
28	All gypsum ceilings to be painted P1 unless noted otherwise.								
29	All door frames in scope of work, including existing frames, to be painted P2 unless noted otherwise.								
30	PPG is the facility standard paint manufacturer. Substitutions are only acceptable with written approval from UMC.								
31	WP1 to begin at approximately 1/2" below top of rubber base without a trim piece or at top of sanitary or integral base with trim piece at edge.								

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Corner guards.
2. Impact-resistant handrails.
3. Bed locators.
4. Abuse-resistant wall coverings.

B. Related Requirements:
1. Section 087100 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For each type of wall and door protection showing locations and extent.

1. Include plans, elevations, sections, and attachment details. Show handrail design and support spacing required to withstand structural loads.

C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

1. Include Samples of accent strips and accessories to verify color selection.

D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:

1. Corner Guards: 12 inches long. Include example top caps.
2. Handrails: 12 inches long. Include examples of joinery, corners, and field splices.
3. Bed Locators: 12 inches long. Include example of end caps.
4. Abuse-Resistant Wall Covering: 6 by 6 inches square.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
2. Keep plastic materials out of direct sunlight.
3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F .

a. Store corner-guard covers in a vertical position.
b. Store wall-guard, bed-locator, and handrail covers in a horizontal position.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in **the Texas Accessibility Standards**.

2.3 MATERIALS

A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; extruded and sheet material, thickness as indicated.

1. Impact Resistance: Minimum 25.4 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543.
3. Self-extinguishing when tested according to ASTM D 635.

4. Flame-Spread Index: 25 or less.
5. Smoke-Developed Index: 450 or less.

B. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less than strength and durability properties specified in ASTM B 221 for Alloy 6063-T5.

C. Stainless-Steel Sheet: ASTM A 240/A 240M.

2.4 CORNER GUARDS

A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Cover: Extruded rigid plastic.

   a. Profile: Nominal 3-inch- long leg and 1/4-inch corner radius, or 2-inch- long leg and 1/4-inch corner radius when 3-inch will not fit.
   b. Height: 4 feet.
   c. Color and Texture: As scheduled or As selected by Architect from manufacturer's full range when product differs.

2. Retainer: Minimum 0.060-inch- thick, one-piece, extruded aluminum.
3. Retainer Clips: Manufacturer's standard impact-absorbing clips.
4. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

B. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.

1. Material: Stainless steel, Type 304.

   a. Thickness: Minimum 0.0625 inch.
   b. Finish: Directional satin, No. 4.

2. Wing Size: Nominal 1-1/2 by 1-1/2 inches.
3. Corner Radius: 1/8 inch.
4. Mounting: Double-faced, adhesive foam tape.

2.5 IMPACT-RESISTANT HANDRAILS

A. Structural Performance: Handrails, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform load of 50 lbf/ft. Insert requirement applied in any direction.
2. Concentrated load of 200 lbf applied in any direction.
3. Uniform and concentrated loads need not be assumed to act concurrently.

B. Plastic, Impact-Resistant Handrails: Manufacturer's standard assembly consisting of snap-on plastic cover installed over continuous retainer.

1. Cover: Minimum 0.078-inch- thick, extruded rigid plastic;

a. Bumper Rail: Cover with profile as scheduled on front side; with 1-1/2-inch-diameter gripping surface and finger recess on back side; supported by concealed, continuous retainer and extended mounting brackets.

1) Bumper-Rail Dimensions, surface, accent inlay strip, color and texture: As scheduled; **Refer to Finish and Materials Schedule Section 099999.**

2. Retainer: Minimum 0.080-inch-thick, one-piece, extruded aluminum.
3. Mounting Bracket: Extended mounting on injection-molded plastic mounting brackets.
4. End Caps and Corners: Prefabricated, injection-molded plastic; matching color cover; field adjustable for close alignment with snap-on cover.
5. Accessories: Concealed splices, cushions, and mounting hardware.

2.6 BED LOCATORS

A. Bed Locators : Manufacturer's standard assembly consisting of continuous snap-on plastic cover installed over continuous retainer; with two bed-locator end caps and mounting hardware; cover designed to spring back when hit.

1. Cover: Extruded rigid plastic, minimum 0.078-inch wall thickness.

a. Profile, color and Textures: As scheduled; **Refer to Finish and Materials Schedule Section 099999.**

2. Retainer: Minimum 0.080-inch-thick, one-piece, extruded aluminum.
3. Bed-Locator End Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
4. Mounting Type: Surface mounted on 1/2-inch-thick cushion spacers.

2.7 ABUSE-RESISTANT WALL COVERINGS

A. Abuse-Resistant Sheet Wall Covering: Fabricated from plastic sheet wall-covering material.

1. Size: 48 by 96 inches for sheet when scheduled or indicated at areas up to 96 inches in height; 48 by 120 inches for roll when scheduled or indicated at areas more than 96 inches in height.
2. Sheet Thickness: 0.06 inch.
3. Color and Texture: **Refer to Finish and Material schedule in Section 099999.**
4. **Height: As indicated or scheduled.**
5. **Trim and Joint Moldings: Extruded rigid plastic that matches sheet wall covering color. All perimeter edges of Wall Covering system are to have J-trim unless concealed by some other means.**
6. **Mounting: Adhesive.**
7. **Panel Layout: Layout of Wall Covering system is to be designed to eliminate vertical and/or horizontal joints to the greatest extent possible and to provide a symmetrical layout of panels on walls unless indicated or scheduled otherwise.**
8. **Termination: Wall covering system is to terminate approximately 1/2" below the top of rubber wall base. If Wall does not have rubber wall base, terminate above scheduled base with J-trim at bottom edge.**
9. **Wall protection panels are to be installed using Interlock brand Spray-Lock FRP Adhesive. Follow manufacturer's recommended installation instructions.**
10. **Wall projection panels are NOT to be installed on textured OR painted walls. If existing surfaces are textured and/or painted, those surfaces are to be properly sanded smooth. If**

surfaces are to be primed, they are to be primed with ONLY manufacturer recommended primers.

2.8 MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

2.9 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. Fabricate Preformed curved or bent semi-rigid, abuse resistant sheet wall coverings in the factory.

C. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

D. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

E. Wood Handrails: Miter corners and ends of wood handrails for returns.

2.10 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings. If not indicated on Drawings, install at heights indicated below (dimensions are to the bottom except for handrail which is to the top):

1. Crash Rails: 8” and above finished floor.
2. Chair Rails: 36” above finished floor.
3. Handrails: 34” above finished floor.
4. Bed Locators: 8” above finished floor.

5. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings or, if not indicated, at heights indicated below:

a. 48” a.f.f. for wainscot applications
b. Full height of wall to ceiling when no other finish is scheduled above.

C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.

1. Provide anchoring devices and suitable locations to withstand imposed loads.
2. Where splices occur in horizontal runs of more than 20 feet , splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
3. Adjust end and top caps as required to ensure tight seams.

D. Abuse-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Accessories found in public and private toilet and shower room facilities, childcare accessories, custodial accessories, and healthcare accessories as scheduled at the end of this Section.

B. Owner-Furnished Material:

1. Paper Towel Dispensers.
2. Soap Dispensers.
3. Toilet Paper Dispensers.

C. Related Sections:

1. Section 088300 "Mirrors" for frameless mirrors.
2. Section 093000 "Tiling" for ceramic toilet and bath accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.7 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Products are to be as scheduled. Any product substitutions must be submitted to and approved by the Architect prior to bid. Refer to the

B. Proposed substitute products must match those scheduled in appearance, construction, function, and quality.

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.3 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET AND BATH ACCESSORY SCHEDULE

At Each New Sink

1 ea.	**Paper Towel Dispenser**	**Owner furnished, Contractor installed**
1 ea.	**Soap Dispenser**	**Owner furnished, Contractor installed**

NOTE: Proposal Item #3 – On-Call Rooms Sink Vanity Owner will install C-Fold Paper Towel Dispensers

Toilet 054 & Toilet 055

1 ea.	**Paper Towel Dispenser**	**Owner furnished, Contractor installed**	
1 ea.	**Soap Dispenser**	**Owner furnished, Contractor installed**	
1 ea.	**Toilet Paper Dispenser**	**Owner furnished, Contractor installed**	
1 ea.	**Framed Mirror**	**B-165 1836**	**Bobrick**
1 ea.	**24" Grab Bar**	**B-6806 x 24**	**Bobrick**
1 ea.	**42" Grab Bar**	**B-6806 x 42**	**Bobrick**

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

1. Show location of knockouts for hose valves.

B. Product Schedule: For fire-protection cabinets. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. J. L. Industries, Inc., a division of Activar Construction Products Group;.
b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc;.
c. Larsen's Manufacturing Company;.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Stainless-steel sheet.

D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.

1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Stainless-steel sheet.

G. Door Style: Vertical duo panel with frame.

H. Door Glazing: Tempered float glass (clear).

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide projecting door pull and friction latch.
2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet glazing.
2) Application Process: Pressure-sensitive vinyl letters.
3) Lettering Color: Red.
4) Orientation: Vertical.

K. Materials:

1. Stainless Steel: ASTM A 666, Type 304.

   a. Finish: No. 4 directional satin finish.

2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:

1. Fire-Protection Cabinets: 48 inches above finished floor to the centerline of the cabinet latch or opening handle.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Provide inside latch and lock for break-glass panels.
2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification: Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers.

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

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

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

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

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
c. Larsen's Manufacturing Company.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Contractor shall have the fire extinguisher inspected within 30 days prior to fire marshal inspection and/or project final completion and provide a signed and dated inspection tag attached to the extinguisher to document this.

3.2 INSTALLATION

A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 104416

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Knocked-down corridor lockers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of metal locker.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.

B. Shop Drawings: For metal lockers.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Show locker trim and accessories.
3. Include locker identification system and numbering sequence.

C. Samples: For each color specified, in manufacturer's standard size.

D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.

E. Samples for Verification: For the following products, in manufacturer's standard size:

1. Lockers and equipment.

F. Product Schedule: For lockers. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in **the Texas Accessibility Standards**.

2.3 LOCKERS

A. Lockers are to be: Three-tier.

B. Doors: One piece; fabricated from 0.060-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.

1. Doors less than 12 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.
2. Doors for box lockers less than 15 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.
3. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
4. Door Style: Vented panel as follows:

    a. Louvered Vents: No fewer than six louver openings at top and bottom for single-tier or three louver openings at top and bottom for double-tier lockers.

C. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated steel sheet with thicknesses as follows:

1. Tops, Bottoms, and Intermediate Dividers: 0.024-inch nominal thickness, with single bend at sides.
2. Backs and Sides: 0.024-inch nominal thickness, with full-height, double-flanged connections.

3. Shelves: 0.024-inchnominal thickness, with double bend at front and single bend at sides and back.

D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.

1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
2. Frame Vents: Fabricate face frames with vents.

E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.

1. Hinges: Manufacturer's standard, steel, continuous or knuckle type.

F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.

1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic latching and prelocking.

a. Latch Hooks: Equip doors 48 inches and higher with three latch hooks and doors less than 48 inches high with two latch hooks; fabricated from 0.105-inch nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.

G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.

H. Hooks: Manufacturer's standard ball-pointed type hooks, aluminum or steel; zinc plated.

I. Continuous Zee Base: Fabricated from manufacturer's standard thickness, but not less than 0.060-inch nominal-thickness steel sheet.

1. Height: 4 inches.

J. Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet.

1. Closures: Vertical-end type.
2. Sloping-top corner fillers, mitered.

K. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

L. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet.

M. Materials:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

N. Finish: Baked enamel or powder coat.

1. Color: Two colors, with door one color and frame and body another color; as selected by Architect from manufacturer's full range.

2.4 LOCKS

A. Combination Padlocks: Provided by Owner.

2.5 FABRICATION

A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.

1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.

C. Equipment: Provide each locker with an identification plate and the following equipment:

1. Single-Tier Units: Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
2. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.

D. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for nominal assembly at Project site.

E. Accessible Lockers: Fabricate as follows:

1. Locate bottom shelf no lower than 15 inches above the floor.
2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.

F. Continuous Base: Formed into channel or zee profile for stiffness, and fabricated in lengths as long as practical to enclose base and base ends of metal lockers; finished to match lockers.

G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.

1. Sloping-top corner fillers, mitered.

H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

I. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

1. Provide one-piece panels for double-row (back-to-back) locker ends.

2.6 ACCESSORIES

A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.

B. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install lockers level, plumb, and true; shim as required, using concealed shims.

1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
3. Anchor back-to-back metal lockers to floor.

B. Knocked-Down Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.

C. Equipment:

1. Attach hooks with at least two fasteners.
2. Attach door locks on doors using security-type fasteners.
3. Identification Plates: Identify metal lockers with identification indicated on Drawings.

a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.

D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach recess trim to recessed metal lockers with concealed clips.
2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
3. Attach sloping-top units to metal lockers, with closures at exposed ends.

4. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

3.3 ADJUSTING

A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.

3.4 PROTECTION

A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

SECTION 123661 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Resin-based solid-surface-material countertops and backsplashes.
   2. Quartz agglomerate countertops and backsplashes.

1.3 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

C. Samples for Verification: For the following products:

   1. Countertop material, 6 inches square.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.6 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 COUNTERTOPS

A. Configuration: Provide countertops with the following front and backsplash style:

1. Front: Full thickness of the material, or laminated material to create 1 ¼" - 1 ½" thick edge profile with slightly eased edges (1/8" radius) and 3/8" radiused corners unless noted otherwise.
2. Backsplash: Straight, slightly eased (1/8" radius) at top and exposed edges, 4" tall unless noted otherwise.

B. Countertops: 1/2-inch- thick for resin-based materials and 1 ¼" (3 cm) for all others.

C. Backsplashes: 1/2-inch- thick for resin-based materials and at least 3/4" (2 cm) for all others.

D. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

E. Joints:

1. Fabricate countertops in sections for joining in field.

a. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.

2.2 COUNTERTOP MATERIALS

A. Subtop Material: Medium-density fiberboard or Medium-density fiberboard made with exterior glue.

B. Subtop Material at Sinks: **Medium-density fiberboard made with exterior glue**.

C. Countertop Products: **Refer to Finish and Materials Schedule in Section 099999. No Substitutions.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Secure countertops to subtops with adhesive according to material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

a. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

a. Seal edges of cutouts in subtops by saturating with varnish.

H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661

SECTION 210510 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL REQUIREMENTS

A. In general, the lines to be installed by the various trades under these specifications shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards as to complete the work in a neat and satisfactorily workable manner. The following is a general outline concerning the running of various lines and ducts and is to be excepted where the drawings or conditions at the building necessitate deviating from these standards.

B. The Contractor shall thoroughly acquaint himself with the details of the construction and finishes before submitting his bid as no allowances will be made because of the Contractor's unfamiliarity with these details. Place all inserts in masonry walls while they are under construction. All concealed lines shall be installed as required by the pace of the general construction to precede that general construction.

C. The plans do not give exact details as to elevations of lines, exact locations, etc., and do not show all the offsets, control lines, pilot lines and other installation details. The Contractor shall carefully lay out his work at the site to conform to the architectural and structural conditions, to provide proper grading of lines, to avoid all obstruction, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactorily operating installation.

D. The plans do not give exact locations of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building, and in cooperation with other sections. Minor relocations necessitated by the conditions at the site or as directed by the Architect shall be made without any additional cost accruing to the Owner.

E. The contractor for the work under each section of these specifications shall coordinate his work with the work described in all other sections of the specifications to the end that, as a whole, the job shall be a finished one of its kind, and shall carry on his work in such a manner that none of the work under any section of these specifications shall be handicapped, hindered or delayed at any time.

F. At all times during the progress of the work, the Contractor shall keep the premises clean and free of unnecessary materials and debris. The Contractor shall, on direction at any time from the Architect, clear any designated areas or area of materials and debris. On completion of any portion of the work, the Contractor shall remove from the premises all tools and machinery and all debris occasioned by the work, leaving the premises free of all obstructions and hindrances.

G. The Contractor shall be responsible for the proper fitting of his material and apparatus into the space. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the drawings, he shall arrange for such space with the Architect before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

H. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans. The drawings shall be checked by the Architect before the work is started. Any conflict with the building conditions shall be corrected by the Contractor before the work proceeds.

I. Order of precedence shall be observed in laying out the pipe, ductwork, material, and conduit in order to fit the material into the space above the ceiling and in the chases and walls. The following order shall govern:

1. Items affecting the visual appearance of the inside of the building such as lighting fixtures, diffusers, grilles, outlets, panelboards, etc. Coordinate all items to avoid conflicts at the site.
2. Lines requiring grade to function such as sewers, roof drains and condensate drains.
3. Large ducts and pipes with critical clearances.
4. Conduit, water lines, and other lines whose routing is not critical and whose function would not be impaired by bends and offsets.

J. Exceptions and inconsistencies in plans and specifications shall be brought to the Architect's attention before the contract is signed. Otherwise, the Contractor shall be responsible for any and all changes and additions that may be necessary to accommodate his particular apparatus, material, or equipment.

K. The Contractor shall distinctly understand that the work described herein and shown on the accompanying drawings shall result in a finished and working job, and any item required to accomplish this intent shall be included whether specifically mentioned or not.

L. Each bidder shall examine the plans and specifications for the General Construction. If these documents show any item requiring work under Division 21 and that work is not indicated on the respective "FP" drawings, he shall notify the Architect in sufficient time to clarify before bidding. If no notification is received, the Contractor is assumed to require no clarification, and shall install the work as indicated on the General Plans in accordance with the specifications.

M. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be submitted to the Architect for consideration before proceeding with the work.

N. The accompanying plans do not indicate completely the existing installations. The bidders for the work under these sections of the specifications shall inspect the existing installations and thoroughly acquaint themselves with conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work in the present building and underground serving to and from that structure. Failure to comply with this shall not constitute grounds for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work.

1.3 SUBMITTALS

A. Wherever shop drawings/submittals are called for in these specifications, they shall be furnished by the Contractor for the work involved after review by the Architect as to the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary details. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary and should there be any charges in connection with this, they shall be borne by the Contractor.

B. Shop drawings will be reviewed by the Architect for general compliance with the design concept of the project and general compliance with the information given in the contract documents. Review by the Architect and any action by the Architect in marking shop drawings is subject to the requirements of the entire contract documents. Contractor will be held responsible for quantities, dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of construction, coordination of all trades and the satisfactory performance of his work.

C. Shop drawings submitted shall not consist of manufacturers' catalogues or tear sheets therefrom that contain no indication of the exact item offered. Rather, the submission of individual items shall designate the exact item offered and shall clearly identify the item with the project.

D. All shop drawings shall be submitted at one time and shall consist of a bound catalogue of all shop drawings under each section, properly indexed and certified that they have been checked by the Contractor.

E. The omissions of any material from the shop drawings which has been shown on the contract drawings or specified, even though reviewed by the Architect, shall not relieve the Contractor from furnishing and erecting same.

1.4 PERMITS, FEES, ETC.

A. The Contractor under each section of these specifications shall arrange for a permit from the local authority. The Contractor shall arrange for all utility services, including sewer, water and gas services as applicable. If any charges are made by any of the utility companies due to the work on this project, the Contractor shall pay these charges, including charges for metering, connection, street cutting, etc. The Contractor shall pay for any inspection fees or other fees and charges required by ordinance, law, codes and these specifications.

1.5 LAWS, CODES, AND ORDINANCES

A. All work shall be executed in strict accordance with all local, state and national codes, ordinances and regulations governing the particular class of work involved, as interpreted by the inspecting authority. The Contractor shall be responsible for the final execution of the work under this heading to suit those requirements. Where these specifications and the accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect, shall prepare any supplemental drawings required illustrating how the work may be installed so as to comply and, on approval, make the changes at no cost to the Owner. On completion of the various portions of the work the installation shall be tested by the constituted authorities, approved and, on completion of the work, the Contractor shall obtain and deliver to the Owner a final certificate of acceptance.

1.6 TESTING

A. The Contractor under each division shall at his own expense perform the various tests as specified and required by the Architect and as required by the State and local authorities. The Contractor shall furnish all fuel and materials necessary for making tests. Notify the Architect a minimum of 24 hours in advance of all tests.

1.7 COORDINATION OF TRADES

A. The Contractor shall be responsible for resolving all coordination required between trades. For example, items furnished under Division 21 which require electrical connections shall be coordinated with Division 26 for:
   1. Voltage
   2. Phase
   3. Ampacity
   4. No. and size of wires
   5. Wiring diagrams
   6. Starter size, details and location
   7. Control devices and details

B. Electrical Characteristics for Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

C. Items furnished under various sections which require plumbing connections shall be coordinated for services, pressure, size and location of connections, type of fuel, clearances for service, auxiliary devices required, etc.

D. Items requiring insulation shall be fully insulated and that insulation shall be checked against manufacturer's directions and job requirements for suitability, coverage, thickness and finish.

E. Items installed in/on finished ceilings shall be coordinated with the ceiling construction. The Contractor under each section shall conform to the reflected ceiling plan and shall secure details and/or samples of the ceiling materials as necessary to insure compatibility. Any device not conforming to this requirement shall be replaced by the Contractor at his expense.

F. All items specified under Division 21 shall be installed tight, plumb, level, square and symmetrically placed in relation to the work of other trades.

G. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

H. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

I. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified by Architect.

1.8 SUBSTITUTIONS

A. Where a definite material or only one manufacturer's name is mentioned in these specifications, it has been done in order to establish a standard. The product of the particular manufacturer mentioned is of satisfactory construction and any substitution must be of quality as good as or better than the named article. No substitution shall be made without review by the Architect, who will be the sole judge of equality.

B. The Contractor shall submit for approval a complete list of the materials he proposes to use. This list shall give manufacturers' names and designations corresponding to each and every item and the submission shall be accompanied by complete descriptive literature and/or any supplementary data, drawings, etc., necessary to give full and complete details.

C. Should a substitution be accepted under the provisions of the conditions of these specifications, and should this substitute prove to be defective or otherwise unsatisfactory for the service for which it is intended within the guarantee period, the Contractor who originally requested the substitution shall replace the substitute material with the specified material.

1.9 INSTALLATION DRAWINGS

A. It shall be incumbent upon the Contractor to prepare special drawings as called for elsewhere herein or as directed by the Architect to coordinate the work under each section, to illustrate changes in his work, to facilitate its concealment in finished spaces to avoid obstructions or to illustrate the adaptability of any item of equipment which he proposes to use.

B. These drawings shall be used in the field for the actual installation of the work. Unless otherwise directed, they shall not be submitted for approval but three copies shall be provided to the Architect for his information.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.11 OPERATING INSTRUCTIONS

A. The Contractor for each section of the work hereunder shall, in cooperation with the representatives of the manufacturers of the various equipment items, carefully instruct the Owner's representatives in the proper operation of each item of equipment and of each system. During the balancing and adjusting of systems, the Owner's representative shall be made familiar with all procedures.

1.12 OPERATING MANUALS

A. Prepare and submit 3 copies of the operating manuals bound in hard covers. Three weeks prior to completion of the work, the Architect will check the manuals and any additional material necessary to complete the manuals shall be furnished and inserted by the Contractor.

B. Manuals shall contain the following data:

1. Catalogue data of all equipment.
2. Shop drawings of all equipment.
3. Temperature control drawings (reduced in size)
4. Start-up instructions for major equipment.
5. Trouble shooting procedures for major equipment.
6. Wiring diagrams.
7. Recommended maintenance schedule for equipment.
8. Parts list for all items.
9. Name and address of each vendor.

1.13 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for fire-suppression items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

D. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.

E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.2 ACCESS DOORS

A. Wherever fire suppression equipment is installed and where future access is required through either walls or ceilings and such cannot be obtained through the removable ceiling or through other means, the Contractor shall provide Milcor Style "M" access doors at least 12 inches by 12 inches in size or larger if required for access. Provide access doors for all valves, etc. Provide Milcor Style "UFR" rated access panels as required for installation in rated construction.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 21 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. Piping:

    a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
    h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Permanent sleeves are not required for holes formed by removable PE sleeves.

N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

    a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
    b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.

c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

Q. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

R. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

S. Verify final equipment locations for roughing-in.

T. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

END OF SECTION 210510

SECTION 211313 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Fire-protection valves.
3. Sprinklers.
4. Alarm devices.
5. Pressure gages.

1.3 DEFINITIONS

A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.4 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if required.

1.5 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified person, using performance requirements and design criteria indicated.

1. Fire-hydrant flow tests not available during production of construction documents. It is the responsibility of the Contractor to acquire flow test records for project prior to bid. The Contractor shall include all components required for fire protection system to properly operate with flow data found.

2. Modify/Extend existing fire sprinkler system in building as required to provide coverage to entire renovation areas. Provide in bid all costs required for a complete and operational fire sprinkler system renovation area.

C. Sprinkler system design shall be approved by authorities having jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
2. Sprinkler Occupancy Hazard Classifications:

    a. Building Service Areas: Ordinary Hazard, Group 1.
    b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
    c. General Storage Areas: Ordinary Hazard, Group 1.
    d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
    e. Office and Public Areas: Light Hazard.
    f. According to NFPA 13 unless otherwise indicated.

3. Minimum Density for Automatic-Sprinkler Piping Design: According to NFPA 13 unless otherwise indicated.

    a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
    b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
    c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area.

4. Maximum Protection Area per Sprinkler: Per UL listing.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.

C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Qualification Data: For qualified Installer.

E. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

F. Fire-hydrant flow test report.

G. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional services needed to assume responsibility. Base calculations on results of fire-hydrant flow test.

B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."

1.8 PROJECT CONDITIONS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Architect no fewer than seven days in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Architect's written permission.

1.9 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.10 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2 STEEL PIPE AND FITTINGS

A. Schedule 40, Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.

B. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Anvil International, Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.

2. Pressure Rating: 175 psig minimum.
3. Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free.

1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:

1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.

B. Manufacturers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Anvil International, Inc.
b. Clow Valve Company; a division of McWane, Inc.
c. Crane Co.; Crane Valve Group; Crane Valves.
d. Crane Co.; Crane Valve Group; Jenkins Valves.
e. Crane Co.; Crane Valve Group; Stockham Division.
f. Fire-End & Croker Corporation.
g. Fire Protection Products, Inc.
h. Milwaukee Valve Company.
i. Mueller Co.; Water Products Division.
j. NIBCO INC.
k. Potter Roemer.
l. Reliable Automatic Sprinkler Co., Inc.
m. Tyco Fire & Building Products LP.
n. Victaulic Company.
o. Viking Corporation.
p. Watts Water Technologies, Inc.

C. Ball Valves:

1. Standard: UL 1091 except with ball instead of disc.
2. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
3. Valves NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
4. Valves NPS 3: Ductile-iron body with grooved ends.

D. Iron Butterfly Valves:

1. Standard: UL 1091.
2. Pressure Rating: 175 psig.
3. Body Material: Cast or ductile iron.
4. Style: Lug or wafer.
5. End Connections: Grooved.

E. Check Valves:

1. Standard: UL 312.
2. Pressure Rating: 250 psig minimum.
3. Type: Swing check.
4. Body Material: Cast iron.
5. End Connections: Flanged or grooved.

F. Iron OS&Y Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 250 psig minimum.
3. Body Material: Cast or ductile iron.
4. End Connections: Flanged or grooved.

2.5 SPRINKLER SPECIALTY PIPE FITTINGS

A. Sprinkler Inspector's Test Fittings:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Cast- or ductile-iron housing with sight glass.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded.

B. Adjustable Drop Nipples:

1. Standard: UL 1474.
2. Pressure Rating: 250 psig minimum.
3. Body Material: Steel pipe with EPDM-rubber O-ring seals.
4. Size: Same as connected piping.
5. Length: Adjustable.
6. Inlet and Outlet: Threaded.

C. Flexible, Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Fivalco Inc.
    b. FlexHead Industries, Inc.
    c. Gateway Tubing, Inc.

2. Standard: UL 1474.
3. Flexible connectors shall have materials suitable for system fluid. Include 250-psig minimum working-pressure rating and ends according to the following:

    a. NPS 2 and Smaller: Threaded.
    b. NPS 2-1/2 and Larger: Flanged.
    c. Option for NPS 2-1/2 and Larger: Grooved for use with grooved-end-pipe couplings.

4. Stainless-Steel-Hose/Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid and UL Listed or FM Approved. Include steel nipples or flanges, welded to hose.

2.6 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Reliable Automatic Sprinkler Co., Inc.
2. Tyco Fire & Building Products LP.
3. Venus Fire Protection Ltd.
4. Victaulic Company.

B. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig minimum.

C. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

D. Open Sprinklers with Heat-Responsive Element Removed: UL 199.

E. Sprinkler Finishes:

1. Chrome plated.
2. Bronze.
3. Painted.

F. Special Coatings:

1. Wax.
2. Lead.
3. Corrosion-resistant paint.

G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Chrome-plated steel, two piece, with 1-inch vertical adjustment.
2. Sidewall Mounting: Chrome-plated steel, one piece, flat.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.

C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 and smaller.

E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

G. Install sprinkler piping with drains for complete system drainage.

H. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

I. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.

J. Install alarm devices in piping systems.

K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.

L. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe

valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

M. Fill sprinkler system piping with water.

3.3 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 and smaller.

C. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

D. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

F. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

G. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.4 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

3.5 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.

B. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

3.6 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire-alarm tests. Operate as required.
6. Verify that equipment hose threads are same as local fire-department equipment.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.8 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

3.9 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

3.10 PIPING SCHEDULE

A. Standard-pressure, wet-pipe sprinkler system, NPS 2 and smaller, shall be the following:

1. Schedule 40, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

B. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 and larger, shall be the following:

1. Schedule 40, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.11 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Concealed sprinklers.
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Upright, pendent, dry sprinklers; and sidewall, dry sprinklers as requried.
5. Special Applications: Extended-coverage, flow-control, and quick-response sprinklers where required.

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
3. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION 211313

SECTION 220510 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

1.4 GENERAL REQUIREMENTS

A. In general, the lines to be installed by the various trades under these specifications shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards as to complete the work in a neat and satisfactorily workable manner. The following is a general outline concerning the running of various lines and ducts and is to be excepted where the drawings or conditions at the building necessitate deviating from these standards.

B. All piping for the plumbing trade shall be concealed in chases in finished areas, except as indicated on the drawings. Horizontal lines run in areas that have ceilings shall be run concealed in those ceilings, unless otherwise specifically indicated or directed.

C. Piping may be run exposed in machinery and equipment spaces, where serving as connections to equipment items in finished rooms where exposed connections are required, and elsewhere as indicated on the drawings or required.

D. The Contractor shall thoroughly acquaint himself with the details of the construction and finishes before submitting his bid as no allowances will be made because of the Contractor's unfamiliarity with these details. Place all inserts in masonry walls while they are under construction. All concealed lines shall be installed as required by the pace of the general construction to precede that general construction.

E. The plumbing plans do not give exact details as to elevations of lines and ducts, exact locations, etc., and do not show all the offsets, control lines, pilot lines and other installation details. The Contractor shall carefully lay out his work at the site to conform to the architectural and structural conditions, to provide proper grading of lines, to avoid all obstruction, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactorily operating installation.

F. The plumbing plans do not give exact locations of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building, and in cooperation with other sections. Minor relocations necessitated by the conditions at the site or as directed by the Architect shall be made without any additional cost accruing to the Owner.

G. The contractor for the work under each section of these specifications shall coordinate his work with the work described in all other sections of the specifications to the end that, as a whole, the job shall be a finished one of its kind, and shall carry on his work in such a manner that none of the work under any section of these specifications shall be handicapped, hindered or delayed at any time.

H. At all times during the progress of the work, the Contractor shall keep the premises clean and free of unnecessary materials and debris. The Contractor shall, on direction at any time from the Architect, clear any designated areas or area of materials and debris. On completion of any portion of the work, the Contractor shall remove from the premises all tools and machinery and all debris occasioned by the work, leaving the premises free of all obstructions and hindrances.

I. The Contractor shall be responsible for the proper fitting of his material and apparatus into the space. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the drawings, he shall arrange for such space with the Architect before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

J. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans. The drawings shall be checked by the Architect before the work is started. Any conflict with the building conditions shall be corrected by the Contractor before the work proceeds.

K. Order of precedence shall be observed in laying out the pipe, ductwork, material, and conduit in order to fit the material into the space above the ceiling and in the chases and walls. The following order shall govern:

1. Items affecting the visual appearance of the inside of the building such as lighting fixtures, diffusers, grilles, outlets, panelboards, etc. Coordinate all items to avoid conflicts at the site.
2. Lines requiring grade to function such as sewers, roof drains and condensate drains.

3. Large ducts and pipes with critical clearances.
4. Conduit, water lines, and other lines whose routing is not critical and whose function would not be impaired by bends and offsets.

L. Piping serving outlets on items of equipment shall be run in the most appropriate manner. Where the equipment has built-in chases, the lines shall be contained therein. Where the equipment is of the open type, the lines shall be run as close as possible to the underside of the top and in a neat and inconspicuous manner.

M. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through windows, doorways or shafts, shall be brought to the job by the Contractor involved and placed in the space before the enclosing structure is completed.

N. Exceptions and inconsistencies in plans and specifications shall be brought to the Architect's attention before the contract is signed. Otherwise, the Contractor shall be responsible for any and all changes and additions that may be necessary to accommodate his particular apparatus, material, or equipment.

O. The Contractor shall distinctly understand that the work described herein and shown on the accompanying drawings shall result in a finished and working job, and any item required to accomplish this intent shall be included whether specifically mentioned or not.

P. Each bidder shall examine the plans and specifications for the General Construction. If these documents show any item requiring work under Division 22 and that work is not indicated on the respective "P" drawings, he shall notify the Architect in sufficient time to clarify before bidding. If no notification is received, the Contractor is assumed to require no clarification, and shall install the work as indicated on the General Plans in accordance with the specifications.

Q. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be submitted to the Architect for consideration before proceeding with the work.

R. The accompanying plans do not indicate completely the existing mechanical installations. The bidders for the work under these sections of the specifications shall inspect the existing installations and thoroughly acquaint themselves with conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work in the present building and underground serving to and from that structure. Failure to comply with this shall not constitute grounds for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work.

1.5 SUBMITTALS

A. Wherever shop drawings/submittals are called for in these specifications, they shall be furnished by the Contractor for the work involved after review by the Architect as to the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary details. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary and should there be any charges in connection with this, they shall be borne by the Contractor.

B. Shop drawings will be reviewed by the Architect for general compliance with the design concept of the project and general compliance with the information given in the contract documents. Review by the

Architect and any action by the Architect in marking shop drawings is subject to the requirements of the entire contract documents. Contractor will be held responsible for quantities, dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of construction, coordination of all trades and the satisfactory performance of his work.

C. Shop drawings submitted shall not consist of manufacturers' catalogues or tear sheets therefrom that contain no indication of the exact item offered. Rather, the submission of individual items shall designate the exact item offered and shall clearly identify the item with the project.

D. All shop drawings shall be submitted at one time and shall consist of a bound catalogue of all shop drawings under each section, properly indexed and certified that they have been checked by the Contractor.

E. The omissions of any material from the shop drawings which has been shown on the contract drawings or specified, even though reviewed by the Architect, shall not relieve the Contractor from furnishing and erecting same.

1.6 PERMITS, FEES, ETC.

A. The Contractor under each section of these specifications shall arrange for a permit from the local authority. The Contractor shall arrange for all utility services, including sewer, water and gas services as applicable. If any charges are made by any of the utility companies due to the work on this project, the Contractor shall pay these charges, including charges for metering, connection, street cutting, etc. The Contractor shall pay for any inspection fees or other fees and charges required by ordinance, law, codes and these specifications.

1.7 LAWS, CODES, AND ORDINANCES

A. All work shall be executed in strict accordance with all local, state and national codes, ordinances and regulations governing the particular class of work involved, as interpreted by the inspecting authority. The Contractor shall be responsible for the final execution of the work under this heading to suit those requirements. Where these specifications and the accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect, shall prepare any supplemental drawings required illustrating how the work may be installed so as to comply and, on approval, make the changes at no cost to the Owner. On completion of the various portions of the work the installation shall be tested by the constituted authorities, approved and, on completion of the work, the Contractor shall obtain and deliver to the Owner a final certificate of acceptance.

1.8 TESTING

A. The Contractor under each division shall at his own expense perform the various tests as specified and required by the Architect and as required by the State and local authorities. The Contractor shall furnish all fuel and materials necessary for making tests. Notify the Architect a minimum of 24 hours in advance of all tests.

1.9 COORDINATION OF TRADES

A. The Contractor shall be responsible for resolving all coordination required between trades. For example, items furnished under Division 22 which require electrical connections shall be coordinated with Division 26 for:
   1. Voltage

2. Phase
3. Ampacity
4. No. and size of wires
5. Wiring diagrams
6. Starter size, details and location
7. Control devices and details

B. Items furnished under various sections which require plumbing connections shall be coordinated for services, pressure, size and location of connections, type of fuel, clearances for service, auxiliary devices required, etc.

C. Items requiring insulation shall be fully insulated and that insulation shall be checked against manufacturer's directions and job requirements for suitability, coverage, thickness and finish.

D. Items installed in/on finished ceilings shall be coordinated with the ceiling construction. The Contractor under each section shall conform to the reflected ceiling plan and shall secure details and/or samples of the ceiling materials as necessary to insure compatibility. Any device not conforming to this requirement shall be replaced by the Contractor at his expense.

E. All items specified under Division 22 shall be installed tight, plumb, level, square and symmetrically placed in relation to the work of other trades.

F. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

G. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

H. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified by Architect.

1.10 CUTTING AND PATCHING

A. All cutting and patching for work under Division 22 shall be done by the Contractor under the section for which the trade is specified.

1.11 QUALITY ASSURANCE

A. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.12 SUBSTITUTIONS

A. Where a definite material or only one manufacturer's name is mentioned in these specifications, it has been done in order to establish a standard. The product of the particular manufacturer mentioned is of satisfactory construction and any substitution must be of quality as good as or better than the named article. No substitution shall be made without review by the Architect, who will be the sole judge of equality.

B. The Contractor shall submit for approval a complete list of the materials he proposes to use. This list shall give manufacturers' names and designations corresponding to each and every item and the submission shall be accompanied by complete descriptive literature and/or any supplementary data, drawings, etc., necessary to give full and complete details.

C. Should a substitution be accepted under the provisions of the conditions of these specifications, and should this substitute prove to be defective or otherwise unsatisfactory for the service for which it is intended within the guarantee period, the Contractor who originally requested the substitution shall replace the substitute material with the specified material.

1.13 INSTALLATION DRAWINGS

A. It shall be incumbent upon the Contractor to prepare special drawings as called for elsewhere herein or as directed by the Architect to coordinate the work under each section, to illustrate changes in his work, to facilitate its concealment in finished spaces to avoid obstructions or to illustrate the adaptability of any item of equipment which he proposes to use.

B. These drawings shall be used in the field for the actual installation of the work. Unless otherwise directed, they shall not be submitted for approval but three copies shall be provided to the Architect for his information.

1.14 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.15 OPERATING INSTRUCTIONS

A. The Contractor for each section of the work hereunder shall, in cooperation with the representatives of the manufacturers of the various equipment items, carefully instruct the Owner's representatives in the proper operation of each item of equipment and of each system. During the balancing and adjusting of systems, the Owner's representative shall be made familiar with all procedures.

1.16 OPERATING MANUALS

A. Prepare and submit 3 copies of the operating manuals bound in hard covers. Three weeks prior to completion of the work, the Architect will check the manuals and any additional material necessary to complete the manuals shall be furnished and inserted by the Contractor.

B. Manuals shall contain the following data:

1. Catalogue data of all equipment.
2. Shop drawings of all equipment.
3. Temperature control drawings (reduced in size)
4. Start-up instructions for major equipment.
5. Trouble shooting procedures for major equipment.
6. Wiring diagrams.
7. Recommended maintenance schedule for equipment.
8. Parts list for all items.

9. Name and address of each vendor.

PART 2 - PRODUCTS

2.1 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

D. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

E. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.2 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.4 ACCESS DOORS

A. Wherever plumbing equipment is installed and where future access is required through either walls or ceilings and such cannot be obtained through the removable ceiling or through other means, the Contractor shall provide Milcor Style "M" access doors at least 12 inches by 12 inches in size or larger if

required for access. Provide access doors for all valves, etc. Provide Milcor Style "UFR" rated access panels as required for installation in rated construction.

2.5 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

D. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.

E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.6 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

A. Refer to Division 1 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type with spring clips.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Permanent sleeves are not required for holes formed by removable PE sleeves.

N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

Q. Verify final equipment locations for roughing-in.

R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 PAINTING

A. Painting of plumbing systems, equipment, and components is specified in Division 9 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish

C. Paint all exposed pipe, cabinets, hangers and supports, and miscellaneous metal.

D. Paint all insulated surfaces exposed to view, including piping, equipment, etc. size surfaces until a smooth, non grainy surface is obtained.

E. Generally, painting is required on all surfaces such that no exposed bare metal or insulation surface is visible.

F. Paint all surfaces above or behind perforated return air grilles or other open spaced air outlet devices with flat black paint. All pipes, conduits, ductwork and structural members shall be painted. These surfaces shall be painted a distance away from the grille such that no unpainted surfaces are visible to a person standing on the room side and viewing through the device.

END OF SECTION 220510

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

1.4 SUBMITTALS

A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set ball and plug valves open to minimize exposure of functional surfaces.
4. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.

2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Manufacturers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Apollo.
b. Nibco

B. Refer to valve schedule articles for applications of valves.

C. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

D. Valve Sizes: Same as upstream piping unless otherwise indicated.

E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Solder Joint: With sockets according to ASME B16.18.
2. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

H. All valves must be lead-free according to Federal Government S.3874.

2.2 BRONZE BALL VALVES

A. Three-Piece, Full-Port, Lead-Free, Bronze Ball Valves with Bronze Trim:

1. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Three piece.
e. Body Material: Bronze.
f. Ends: Threaded.
g. Seats: PTFE or TFE.
h. Stem: Bronze.
i. Ball: Chrome-plated brass.
j. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball valves.
2. Throttling Service: Ball valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

END OF SECTION 220523

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.
5. Pipe stands.
6. Pipe positioning systems.
7. Equipment supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.
c. Flex-Strut Inc.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut Corporation; Tyco International, Ltd.

2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless-] steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 1-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
b. NPS 4: 12 inches long and 0.06 inch thick.
c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

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 welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and attachments for general service applications.

F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for

erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

a. Horizontal (MSS Type 54): Mounted horizontally.
b. Vertical (MSS Type 55): Mounted vertically.
c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

R. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipe labels.
2. Valve tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

C. Valve numbering scheme.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.2 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass S-hook and chain. Secure chain to valve by use of copper or monel meter seals.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 30 feet along each run. Reduce intervals to 15 feet in areas of congested piping and equipment.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units.

B. List tagged valves in a valve schedule. Valve schedule shall properly identify the valve number and service with the exact location, the material being piped, and the room number or area that the valve services.

C. Install tags only on major service valves serving multiple fixtures. Valve tags not required for isolation valves serving a single fixture.

END OF SECTION 220553

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes insulating the plumbing piping.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.

C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
2. Service Temperature Range: Minus 20 to plus 180 deg F.
3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
4. Color: White.

2.5 SEALANTS

A. Joint Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 100 to plus 300 deg F.
4. Color: White or gray.
5. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.
5. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

6. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

2.7 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches.
2. Thickness: 11.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.

3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. All Sizes: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick. Vapor seal all insulation.

B. Domestic Hot Water:

1. Sizes 1-1/4” and Smaller: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

2. Sizes 1-1/2” and Larger: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Domestic water pipes, tubes, fittings, and specialties inside the building.

1.3 SUBMITTALS

A. Product Data: For the following products:

1. Piping.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.

C. Comply with NSF 61 for potable domestic water piping and components.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Architect no fewer than seven days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Architect's written permission.

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Description:

a. Standard: ASSE 1079.
b. Pressure Rating: 150 psig minimum at 180 deg F.
c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description:

a. Standard: ASSE 1079.
b. Factory-fabricated, bolted, companion-flange assembly.
c. Pressure Rating: 150 psig minimum at 180 deg F.
d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install shutoff valve immediately upstream of each dielectric fitting.

D. Install domestic water piping level with 0.25 percent slope downward toward drain.

E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

H. Install piping adjacent to equipment and specialties to allow service and maintenance.

I. Install piping to permit valve servicing.

J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

K. Install piping free of sags and bends.

L. Install fittings for changes in direction and branch connections.

M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

N. Install pressure gages on suction and discharge piping from each plumbing pump and packaged booster pump. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages.

O. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

P. Install thermostats in hot-water circulation piping. Comply with requirements in Division 22 Section "Domestic Water Pumps" for thermostats.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors.

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

D. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.3 VALVE INSTALLATION

A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.

B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops.

C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."

1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.

3.4 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. NPS 1-1/2 and Smaller: Fitting-type coupling.
2. NPS 2 and Larger: Sleeve-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.5 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.

D. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.

B. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet If Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.
7. NPS 8: 10 feet with 3/4-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
2. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

    a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
    b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
    b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.

3.13 PIPING SCHEDULE

A. Aboveground domestic water piping, All Sizes, shall be the following:

1. Hard copper tube, ASTM B 88, Type L; wrought- copper solder-joint fittings; and soldered joints.

3.14 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
2. Throttling Duty: Use ball valves for piping NPS 2 and smaller. Use ball valves with flanged ends for piping NPS 2-1/2 and larger.
3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
4. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following domestic water piping specialties:

1. Balancing valves.
2. Drain valves.
3. Water hammer arresters.
4. Air vents.

1.3 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 BALANCING VALVES

A. Hot Water Return Line Balancing Valve:
1. Furnish and install CIRCUITSOLVER® UNION ASSEMBLY as indicated on the plans. CIRCUITSOLVER® ASSEMBLY shall be self contained and fully automatic without additional

piping or control mechanisms. Thermostatic valve shall be a CIRCUITSOLVER® asmanufactured by ThermOmegaTech®, Inc., or equivalent.

a. CIRCUITSOLVER® shall regulate the flow of recirculated domestic hot water based on water temperature entering the CIRCUITSOLVER® UNION ASSEMBLY regardless of system operating pressure. As the water temperature increases the valve proportionally closes dynamically adjusting flow to meet the specified temperature.
   1) The CIRCUITSOLVER® never fully closes, even at the desired set point. There is always sufficient bypass flow back to the recirculating pump to prevent overheating or "dead heading" of the pump.
   2) CIRCUITSOLVER® is set at the factory for the desired return temperature. No field adjustments needed. Several temperature set points are available.
   3) CIRCUITSOLVER® UNION ASSEMBLY shall be available in ½", ¾", & 1" with FNPT at both ends.

2. All components in the CIRCUITSOLVER® ASSEMBLY are made with lead-free materials. The major components that make up the CIRCUITSOLVER® are constructed of type 303 SS.
   a. CIRCUITSOLVER® UNION ASSEMBLY shall be rated to 200 PSIG maximum working pressure.
      1) CIRCUITSOLVER® UNION ASSEMBLY shall be standard tapered female pipe thread, NPT.
   b. CIRCUITSOLVER® UNION ASSEMBLY shall be rated to 250°F (121.1°C) maximum working temperature.
   c. CIRCUITSOLVER® UNION ASSEMBLY shall have all lead-free components.
   d. Thermal actuator shall be spring-loaded and self-cleaning, delivering closing thrust sufficient to keep orifice opening free of scale deposits.
3. Installation of CIRCUITSOLVER® UNION ASSEMBLY shall be made by qualified tradesmen. Install CIRCUITSOLVER® UNION ASSEMBLY in each domestic hot water return piping branch beyond last hot water device in that branch.
   a. Provide suitable strainer as indicated in piping detail shown on the drawings.
   b. Provide suitable access panel as required in non-accessible ceilings and walls.
   c. Pay close attention to flow arrow, especially with valves that have an integrated check valve

2.2 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.3 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Josam Company.
b. MIFAB, Inc.
c. PPP Inc.
d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
e. Tyler Pipe; Wade Div.
f. Watts Drainage Products Inc.
g. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper Shell, hydro-pneumatic air cushion and O-Ring sealed piston.
4. Size: PDI WH-2010 Sizes A through F.

2.4 AIR VENTS

A. Bolted-Construction Automatic Air Vents:

1. Body: Bronze.
2. Pressure Rating: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 1/2 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.

B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
3. Do not install bypass piping around backflow preventers.

C. Install balancing valves in locations where they can easily be adjusted.

D. Install outlet boxes recessed in wall. Install 2-by-4-inch fire-retardant-treated-wood blocking wall reinforcement between studs. Fire-retardant-treated-wood blocking is specified in Division 06 Section "Rough Carpentry."

E. Install water hammer arresters in water piping according to PDI-WH 201.

F. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and prepare test reports:

1. Test each reduced-pressure-principle backflow preventer, double-check backflow-prevention assembly, and, double-check, detector-assembly backflow preventer according to authorities having jurisdiction and the device's reference standard.

B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

END OF SECTION 221119

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

C. Cast Iron Soil Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute or receive prior approval from the engineer.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of sanitary waste service.
2. Do not proceed with interruption of sanitary waste service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, COATED, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 and CISPI 301. Equal to Charlotte Pipe Edge HP Iron.

B. Tensile Strength: 21,000 psig minimum.

C. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe

D. Institute® and listed by NSF® International. Each length of pipe and each fitting shall be plainly marked with size, country of origin, and name of manufacturer, or manufacturer's registered trademark by which the manufacturer can be readily identified after installation. The inside of each pipe shall be reamed prior to coating to decrease the coefficient of friction.

E. Coupling: Husky SD 4000 heavy duty all stainless steel coupling.

F. Pipe Coating: Chemically deposited zinc-phosphate pretreatment layer followed by an electricallydeposited, high-performance cathodic epoxy coating, and finally an electrically deposited, highperformance anodic epoxy top coat.

G. Fitting Coating: Chemically deposited zinc-phosphate pretreatment layer followed by an electrically deposited, high-performance cathodic epoxy coating, and finally an epoxy acrylic powder top coat.

H. Coating Performance: Pipe and Fitting Coatings must pass the following performance specifications per EN 877:
1. 350 hours of salt spray testing
2. Resistance to wastewater for 30 days at 73° F
3. Chemical resistance from pH 2 to pH 12 for 30 days at 73° F
4. Resistance to hot water for 24 hours at 203° F

2.3 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

L. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.

N. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.

O. Plumbing Specialties:

1. Install backwater valves in sanitary waster gravity-flow piping. Comply with requirements for backwater valves specified in Division 22 Section "Sanitary Waste Piping Specialties."
2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with requirements for cleanouts specified in Division 22 Section "Sanitary Waste Piping Specialties."
3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Division 22 Section "Sanitary Waste Piping Specialties."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors.

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

C. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

D. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.

3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting[**, valve,**] and coupling.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
5. NPS 6: 10 feet with 5/8-inch rod.
6. NPS 8: 10 feet with 3/4-inch rod.

H. Install supports for vertical copper tubing every 10 feet.

I. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 48 inches with 7/8-inch rod.

J. Install supports for vertical PVC piping every 48 inches.

K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
5. Install horizontal backwater valves with cleanout cover flush with floor.
6. Comply with requirements for backwater valves cleanouts and drains specified in Division 22 Section "Sanitary Waste Piping Specialties."
7. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.6 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection (8 hours), water level must not drop more than 1". Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.9 PIPING SCHEDULE

A. Aboveground, soil and waste piping shall be the following:

1. Hubless, COATED, cast-iron soil pipe and fittings; High performance coated cast iron piping equal to Charlotte Pipe Edge HP Iron.

B. Underground, soil, waste, and vent piping shall be the following:

1. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints, unless noted otherwise.

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following sanitary drainage piping specialties:

1. Cleanouts.
2. Miscellaneous sanitary drainage piping specialties.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.5 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.1 REFER TO PLUMBING FIXTURE SCHEDULE ON DRAWINGS FOR ADDITINOAL SPECIALTIES

2.2 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.

2. Size: Same as connected waste piping.

a. NPS 2: 4-inch- minimum water seal.
b. NPS 2-1/2 and Larger: 5-inch- minimum water seal.

B. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.

B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

E. Install deep-seal traps on floor drains and other waste outlets.

F. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

G. Install wood-blocking reinforcement for wall-mounting-type specialties.

H. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

SECTION 224100 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes plumbing fixtures and related components:

1.3 DEFINITIONS

A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

1.4 SUBMITTALS

A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.

1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Manufacturers for plumbing fixtures and related trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fixtures:
   1) Kohler Co.
   2) American Standard Co.
   3) Sloan Valve Company

b. Faucets:
   1) T&S Brass

c. Flushometers
   1) Sloan Valve Company
   2) Zurn Industries (AV)

d. Seats
   1) Bemis Manufacturing
   2) Centoco Manufacturing
   3) Church

e. Sinks
   1) Elkay Manufacturing Co
   2) Just Manufacturing Co
   3) Sloan

f. Shower Valves
   1) Delta Commercial

g. Carriers
   1) Josam Company
   2) MIFAB, Inc.
   3) Smith, Jay R. Mfg
   4) Tyler Pipe; Wade Div
   5) Watts Drainage Products
   6) Zurn Plumbing Products Group

h. Mop Basins
   1) Stern-Williams
   2) Fiat

i. P-Traps, Stops and Supplies
   1) McGuire Manufacturing
   2) Kohler Co.
   3) Brasscraft
   4) Chicago Faucet
   5) T&S Brass

2.2 REFER TO DRAWINGS FOR PLUMBING FIXTURE SCHEDULE

2.3 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Piping Enclosures, provide on all sinks and lavatories with exposed trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Plumberex
b. TRUEBRO, Inc.

2. Description: Insulate per ADA 4.19.4 and or IBC all exposed lavatories drain piping, hot/cold stops and supplies. Protectors will consist of molded closed cell PVC, with anti-fungal and anti-microbial properties. To be one piece continuous smooth design.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.

1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.

D. Install wall-mounting fixtures with tubular waste piping attached to supports.

E. Install counter-mounting fixtures in and attached to casework.

F. Install fixtures level and plumb according to roughing-in drawings.

G. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

H. Install semi cast brass trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

J. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

K. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.

L. Install toilet seats on water closets.

M. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

N. Install shower flow-control fittings with specified maximum flow rates in shower arms.

O. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.
2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

P. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.

Q. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 7 Section "Joint Sealants."

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to Division 26.

3.4 FIELD QUALITY CONTROL

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.5 ADJUSTING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.

C. Replace washers and seals of leaking and dripping faucets and stops.

3.6 CLEANING

A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.

B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224100

SECTION 230510 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Escutcheons.
3. HVAC demolition.
4. Equipment installation requirements common to equipment sections.
5. Painting and finishing.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

1.5 GENERAL REQUIREMENTS

A. In general, the lines and ducts to be installed by the various trades under these specifications shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards as to complete the work in a neat and satisfactorily workable manner. The following is a general outline concerning the running of various lines and ducts and is to be excepted where the drawings or conditions at the building necessitate deviating from these standards.

B. All piping and ductwork for the mechanical trade shall be concealed in chases in finished areas, except as indicated on the drawings. Horizontal lines run in areas that have ceilings shall be run concealed in those ceilings, unless otherwise specifically indicated or directed.

C. Piping and ductwork may be run exposed in machinery and equipment spaces, where serving as connections to equipment items in finished rooms where exposed connections are required, and elsewhere as indicated on the drawings or required.

D. The Contractor shall thoroughly acquaint himself with the details of the construction and finishes before submitting his bid as no allowances will be made because of the Contractor's unfamiliarity with these details. Place all inserts in masonry walls while they are under construction. All concealed lines shall be installed as required by the pace of the general construction to precede that general construction.

E. The mechanical plans do not give exact details as to elevations of lines and ducts, exact locations, etc., and do not show all the offsets, control lines, pilot lines and other installation details. The Contractor shall carefully lay out his work at the site to conform to the architectural and structural conditions, to provide proper grading of lines, to avoid all obstruction, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactorily operating installation.

F. The mechanical plans do not give exact locations of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building, and in cooperation with other sections. Minor relocations necessitated by the conditions at the site or as directed by the Architect shall be made without any additional cost accruing to the Owner.

G. The contractor for the work under each section of these specifications shall coordinate his work with the work described in all other sections of the specifications to the end that, as a whole, the job shall be a finished one of its kind, and shall carry on his work in such a manner that none of the work under any section of these specifications shall be handicapped, hindered or delayed at any time.

H. At all times during the progress of the work, the Contractor shall keep the premises clean and free of unnecessary materials and debris. The Contractor shall, on direction at any time from the Architect, clear any designated areas or area of materials and debris. On completion of any portion of the work, the Contractor shall remove from the premises all tools and machinery and all debris occasioned by the work, leaving the premises free of all obstructions and hindrances.

I. The Contractor shall be responsible for the proper fitting of his material and apparatus into the space. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the drawings, he shall arrange for such space with the Architect before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

J. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans. The drawings shall be checked by the Architect before the work is started. Any conflict with the building conditions shall be corrected by the Contractor before the work proceeds.

K. Order of precedence shall be observed in laying out the pipe, ductwork, material, and conduit in order to fit the material into the space above the ceiling and in the chases and walls. The following order shall govern:

1. Items affecting the visual appearance of the inside of the building such as lighting fixtures, diffusers, grilles, outlets, panelboards, etc. Coordinate all items to avoid conflicts at the site.
2. Lines requiring grade to function such as sewers, roof drains and condensate drains.
3. Large ducts and pipes with critical clearances.
4. Conduit, water lines, and other lines whose routing is not critical and whose function would not be impaired by bends and offsets.

L. Piping and ducts serving outlets on items of equipment shall be run in the most appropriate manner. Where the equipment has built-in chases, the lines shall be contained therein. Where the equipment is of the open type, the lines shall be run as close as possible to the underside of the top and in a neat and inconspicuous manner.

M. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through windows, doorways or shafts, shall be brought to the job by the Contractor involved and placed in the space before the enclosing structure is completed.

N. Exceptions and inconsistencies in plans and specifications shall be brought to the Architect's attention before the contract is signed. Otherwise, the Contractor shall be responsible for any and all changes and additions that may be necessary to accommodate his particular apparatus, material, or equipment.

O. The Contractor shall distinctly understand that the work described herein and shown on the accompanying drawings shall result in a finished and working job, and any item required to accomplish this intent shall be included whether specifically mentioned or not.

P. Each bidder shall examine the plans and specifications for the General Construction. If these documents show any item requiring work under Division 23 and that work is not indicated on the respective "M" drawings, he shall notify the Architect in sufficient time to clarify before bidding. If no notification is received, the Contractor is assumed to require no clarification, and shall install the work as indicated on the General Plans in accordance with the specifications.

Q. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be submitted to the Architect for consideration before proceeding with the work.

R. The accompanying plans do not indicate completely the existing mechanical installations. The bidders for the work under these sections of the specifications shall inspect the existing installations and thoroughly acquaint themselves with conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work in the present building and underground serving to and from that structure. Failure to comply with this shall not constitute grounds for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work.

1.6 SUBMITTALS

A. Wherever shop drawings/submittals are called for in these specifications, they shall be furnished by the Contractor for the work involved after review by the Architect as to the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job and failure on the part of the Contractor to comply shall render him liable to stand the expense of

any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary details. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary and should there be any charges in connection with this, they shall be borne by the Contractor.

B. Shop drawings will be reviewed by the Architect for general compliance with the design concept of the project and general compliance with the information given in the contract documents. Review by the Architect and any action by the Architect in marking shop drawings is subject to the requirements of the entire contract documents. Contractor will be held responsible for quantities, dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of construction, coordination of all trades and the satisfactory performance of his work.

C. Shop drawings submitted shall not consist of manufacturers' catalogues or tear sheets therefrom that contain no indication of the exact item offered. Rather, the submission of individual items shall designate the exact item offered and shall clearly identify the item with the project.

D. All shop drawings shall be submitted at one time and shall consist of a bound catalogue of all shop drawings under each section, properly indexed and certified that they have been checked by the Contractor.

E. The omissions of any material from the shop drawings which has been shown on the contract drawings or specified, even though reviewed by the Architect, shall not relieve the Contractor from furnishing and erecting same.

1.7 PERMITS, FEES, ETC.

A. The Contractor under each section of these specifications shall arrange for a permit from the local authority. The Contractor shall arrange for all utility services, including sewer, water and gas services as applicable. If any charges are made by any of the utility companies due to the work on this project, the Contractor shall pay these charges, including charges for metering, connection, street cutting, etc. The Contractor shall pay for any inspection fees or other fees and charges required by ordinance, law, codes and these specifications.

1.8 LAWS, CODES, AND ORDINANCES

A. All work shall be executed in strict accordance with all local, state and national codes, ordinances and regulations governing the particular class of work involved, as interpreted by the inspecting authority. The Contractor shall be responsible for the final execution of the work under this heading to suit those requirements. Where these specifications and the accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect, shall prepare any supplemental drawings required illustrating how the work may be installed so as to comply and, on approval, make the changes at no cost to the Owner. On completion of the various portions of the work the installation shall be tested by the constituted authorities, approved and, on completion of the work, the Contractor shall obtain and deliver to the Owner a final certificate of acceptance.

1.9 TESTING

A. The Contractor under each division shall at his own expense perform the various tests as specified and required by the Architect and as required by the State and local authorities. The Contractor shall furnish all fuel and materials necessary for making tests. Notify the Architect a minimum of 24 hours in advance of all tests.

1.10 COORDINATION OF TRADES

A. The Contractor shall be responsible for resolving all coordination required between trades. For example, items furnished under Division 23 which require electrical connections shall be coordinated with Division 26 for:
   1. Voltage
   2. Phase
   3. Ampacity
   4. No. and size of wires
   5. Wiring diagrams
   6. Starter size, details and location
   7. Control devices and details

B. Items furnished under various sections which require plumbing connections shall be coordinated for services, pressure, size and location of connections, type of fuel, clearances for service, auxiliary devices required, etc.

C. Items requiring insulation shall be fully insulated and that insulation shall be checked against manufacturer's directions and job requirements for suitability, coverage, thickness and finish.

D. Items installed in/on finished ceilings shall be coordinated with the ceiling construction. The Contractor under each section shall conform to the reflected ceiling plan and shall secure details and/or samples of the ceiling materials as necessary to insure compatibility. Any device not conforming to this requirement shall be replaced by the Contractor at his expense.

E. All items specified under Division 23 shall be installed tight, plumb, level, square and symmetrically placed in relation to the work of other trades.

F. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

G. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

H. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified by Architect.

1.11 CUTTING AND PATCHING

A. All cutting and patching for work under Division 23 shall be done by the Contractor under the section for which the trade is specified.

1.12 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

   1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
   2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.13 SUBSTITUTIONS

A. Where a definite material or only one manufacturer's name is mentioned in these specifications, it has been done in order to establish a standard. The product of the particular manufacturer mentioned is of satisfactory construction and any substitution must be of quality as good as or better than the named article. No substitution shall be made without review by the Architect, who will be the sole judge of equality.

B. The Contractor shall submit for approval a complete list of the materials he proposes to use. This list shall give manufacturers' names and designations corresponding to each and every item and the submission shall be accompanied by complete descriptive literature and/or any supplementary data, drawings, etc., necessary to give full and complete details.

C. Should a substitution be accepted under the provisions of the conditions of these specifications, and should this substitute prove to be defective or otherwise unsatisfactory for the service for which it is intended within the guarantee period, the Contractor who originally requested the substitution shall replace the substitute material with the specified material.

1.14 USE OF SYSTEMS

A. It is considered that it will be necessary to operate the mechanical systems to provide heating and ventilation in portions of the building that are enclosed. As systems or portions of systems become operable, they shall be operated as required to maintain habitable conditions in enclosed portions of the building that are still under construction and portions that are fully complete as may be required to properly protect installed piping, equipment and finishes.

B. In order to provide protection to ducts, plenums, etc. install temporary filters over or in return air openings until all finished painting is completed. Protect supply outlets, coils, etc. as necessary in each case.

C. Except for operation of cooling equipment to prove its performance and to adjust and balance the systems, that equipment will not be operated for comfort of construction workers.

D. During warm weather the Contractor shall arrange for the operation of systems to supply 100 percent outside air. The systems controls shall be reset to their normal cycle of operation in each case during the times that heating is required and when the cooling equipment is operated.

E. Immediately prior to the time that the systems are to be accepted by the Owner, each system shall be carefully examined and if ductwork is dirty, it shall be carefully cleaned by men skilled in that type of work. All filters shall be put in first class condition by replacement of filters and/or other procedures as directed.

F. The use of the equipment for maintaining environmental and/or protective temperature conditions shall in no way constitute acceptance of that equipment and the connected piping, ducts, insulation, finishes, etc. by the Owner. Furthermore, it shall in no way shorten the guarantee period hereinafter specified. The Contractor shall either secure extended warranties from the vendors of equipment or shall purchase insurance to provide proper coverage on the equipment through the guarantee period and shall file with the Architect substantiating affidavits from equipment manufacturers or a copy of the insurance policy

covering the equipment through the guarantee period. The personal underwriting of the Contractor for equipment manufacturers' warranties is not acceptable, but his personal underwriting of piping, ductwork, insulation and associated materials is acceptable subject to the provisions of the contract.

G. The Contractor shall provide such labor as may be required in the operation of the systems and shall pay all costs.

1.15 INSTALLATION DRAWINGS

A. It shall be incumbent upon the Contractor to prepare special drawings as called for elsewhere herein or as directed by the Architect to coordinate the work under each section, to illustrate changes in his work, to facilitate its concealment in finished spaces to avoid obstructions or to illustrate the adaptability of any item of equipment which he proposes to use.

B. These drawings shall be used in the field for the actual installation of the work. Unless otherwise directed, they shall not be submitted for approval but three copies shall be provided to the Architect for his information.

1.16 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.17 OPERATING INSTRUCTIONS

A. The Contractor for each section of the work hereunder shall, in cooperation with the representatives of the manufacturers of the various equipment items, carefully instruct the Owner's representatives in the proper operation of each item of equipment and of each system. During the balancing and adjusting of systems, the Owner's representative shall be made familiar with all procedures.

1.18 OPERATING MANUALS

A. Prepare and submit 3 copies of the operating manuals bound in hard covers. Three weeks prior to completion of the work, the Architect will check the manuals and any additional material necessary to complete the manuals shall be furnished and inserted by the Contractor.

B. Manuals shall contain the following data:

1. Catalogue data of all equipment.
2. Shop drawings of all equipment.
3. Temperature control drawings (reduced in size)
4. Start-up instructions for major equipment.
5. Trouble shooting procedures for major equipment.
6. Wiring diagrams.
7. Recommended maintenance schedule for equipment.
8. Parts list for all items.
9. Name and address of each vendor.

PART 2 - PRODUCTS

2.1 JOINING MATERIALS

A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

2.2 ACCESS DOORS

A. Wherever mechanical and/or plumbing equipment is installed and where future access is required through either walls or ceilings and such cannot be obtained through the removable ceiling or through other means, the Contractor shall provide Milcor Style "M" access doors at least 12 inches by 12 inches in size or larger if required for access. Provide access doors for all fire dampers, smoke dampers, valves, etc. Provide Milcor Style "UFR" rated access panels as required for installation in rated construction.

2.3 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

D. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.

E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

PART 3 - EXECUTION

3.1 HVAC DEMOLITION

A. Refer to Division 1 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. Piping:

    a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
    h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Permanent sleeves are not required for holes formed by removable PE sleeves.

N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

Q. Verify final equipment locations for roughing-in.

R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

A. Painting of HVAC systems, equipment, and components is specified in Division 9 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish

C. Paint all exposed pipe, cabinets, hangers and supports, and miscellaneous metal.

D. Paint all exposed sheet metal.

E. Paint all insulated surfaces exposed to view, including piping, equipment, etc. size surfaces until a smooth, non grainy surface is obtained.

F. Generally, painting is required on all surfaces such that no exposed bare metal or insulation surface is visible.

G. Paint all surfaces above or behind perforated return air grilles or other open spaced air outlet devices with flat black paint. All pipes, conduits, ductwork and structural members shall be painted. These surfaces shall be painted a distance away from the grille such that no unpainted surfaces are visible to a person standing on the room side and viewing through the device.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.

C. Field Welding: Comply with AWS D1.1.

END OF SECTION 230510

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.
5. Pipe stands.
6. Pipe positioning systems.
7. Equipment supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.
c. Flex-Strut Inc.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut Corporation; Tyco International, Ltd.

2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless-] steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 1-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
b. NPS 4: 12 inches long and 0.06 inch thick.
c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

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 welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and attachments for general service applications.

F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for

erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

a. Horizontal (MSS Type 54): Mounted horizontally.
b. Vertical (MSS Type 55): Mounted vertically.
c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

R. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 230529

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Duct labels.
4. Valve tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch, Stainless steel, 0.025-inch, Aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.3 DUCT LABELS

A. Stencil: Identify ductwork with stencil. Painted stencils shall be black, equal to Glidden #79-61.

B. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Service: Indicate exhaust fan number or air handling unit number and area served.
3. Lettering Size: At least 4 inches high.

2.4 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 30 feet along each run. Reduce intervals to 15 feet in areas of congested piping and equipment.

B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 20 feet in each space where ducts are exposed or concealed.

C. The contractor shall mark each manual balancing damper with fluorescent yellow 1-3/16" wide plastic flagging tape equal to Seton 25468. Tape shall hang minimum 12" below duct.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule. Valve schedule shall properly identify the valve number and service with the exact location, the material being piped, and the room number or area that the valve services.

END OF SECTION 230553

SECTION 230590 – TEMPERATURE REGULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes control equipment for HVAC systems and components.

1.3 DEFINITIONS

A. FMS: Facility Management System.
B. ASC: Application Specific Controller.
C. BMS: Building Management System.
D. DDC: Direct Digital Control
E. GUI: Graphical User Interface
F. HVAC: Heating, Ventilation, and Air Conditioning
G. LAN: Local Area Network.
H. PID: Proportional, Integral, Derivative
I. NAE: Network Automation Engineer
J. UNT: Unitary Controller
K. VAV: Variable Air Volume
L. UDP: User Datagram Protocol

1.4 SCOPE

A. Furnish and install a BMS to control the equipment as shown on the drawings and described herein.

B. Provide BACnet integration into the Phoenix system and create a graphical user interface for equipment shown on drawings. Pressure Monitors shall be provided and installed by Phoenix.

C. Provide DDC control of return fan as shown on drawings.

D. Scope of work consist of new dual duct terminal units and single duct terminal units with hot water reheat. On Basement Pharmacy project the Dual duct terminal units shall report to UMC server and the single duct terminal units shall report to the TTUHSC server.

E. Furnish and install CVM terminal unit field controllers with integrated actuators for DDC control of single & dual duct terminal units.

F. Provide and install the 120V/24V transformers for adequate power to all the new electronic controls. All 120V power requirements to control panels shall be provided by division 26 contractor.

G. Furnish all labor, materials, equipment, and service necessary for a complete and operating temperature control system, utilizing a high-speed peer to peer network of Direct Digital Controls as shown on the drawings and as described herein.

H. Drawings are diagrammatic only. Equipment and labor not specifically referred to herein or on the plans, that are required to meet the functional intent, shall be provided without additional cost to the Owner.

I. Complete temperature control system to be DDC with electronic sensors and electric actuation of valves and dampers and electronic actuation of terminal equipment valves and actuators as specified herein.

J. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work and in the regular employment of the temperature control system manufacturer. The local installing office shall be a manufactured owned branch and shall have a minimum of twenty years of installation experience. Supervision, calibration and checkout of the system shall be by the employees of the local temperature control contracting office. Supplier shall have an in-place support facility within 150 miles of the site with technical staff, spare parts inventory and all necessary test and diagnostic equipment.

K. All installation labor (i.e. wiring, conduit, tubing, etc.) and installation material for the installation of the control system, including all power requirements, shall be provided by the temperature control subcontractor.

1.5 FMS DESCRIPTION

A. The FMS shall be a complete system designed for use on Intranets and the Internet. This functionality shall extend into the equipment rooms. Contractor shall be responsible for coordination with the owner's IT staff to ensure that the FMS will perform in the owner's environment without disruption to any of the other activities taking place on that LAN.

B. All points of user interface shall be on standard PCs that do not require the purchase of any special software from the FMS manufacturer for use as a building operations terminal. The primary point of interface on these PCs will be a standard Web Browser such as Internet Explorer or Netscape.

C. The FMS work shall consist of all labor, materials, tools, equipment, software, software licenses, wiring, tubing, installation, engineering, calibration, documentation, submittals, testing, verification, training services, permits and licenses, management, warranties, services and items as Specified in these Division documents which are required for the complete, fully functional and commissioned FMS.

1.6 QUALITY ASSURANCE

A. Bids by wholesalers, franchised, and non-franchised contractors shall not be acceptable.

B. The system manufacturer shall, as a minimum, manufacture and supply the Application Specific Controllers, Supervisory Controllers, Graphical User Interface, damper actuators, and valve actuator assembly.

C. The Building Management System contractor shall have a full service facility that is staffed with engineers in Johnson Controls systems and technicians fully capable of providing instructions and routine emergency maintenance service on all Johnson Controls system components.

D. Mechanical equipment manufacturers desiring to provide DDC type controls as factory mounted equipment shall not be acceptable.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilation Systems."

G. Comply with National Electric Code.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to unit manufacturer.

1.8 COORDINATION

A. Coordinate location of thermostats and other exposed control sensors with plans and room details before installation.

B. Coordinate supply of conditioned electrical circuits for control units and panels; electrical circuits provided by electrical contractor.

1.9 SYSTEM INSTALLATION GUIDELINES

A. All exposed temperature control and interlock wiring shall be installed in conduit, unless otherwise noted on the plans. Power or interlock wiring shall be run in separate conduit from sensor and communications wiring.

B. All non-plenum rated cable will be run in conduit from termination to termination points.

C. Plenum rated cabling run in the return plenum above dropped ceilings does not need to be run in conduit, but shall be installed and supported as close as possible to the structural members. Main cable bundles shall, in general, run above Corridor ceilings, with individual cables extending above ceiling to the terminal units. Cable shall not lay on the ceiling grid, lights, ductwork etc. It will be run at right angles, parallel and perpendicular to the building lines with run outs into rooms being perpendicular to the main cable bundles.

D. All wiring within Mechanical Rooms or Air Handling Rooms shall be run in conduit. Wiring extending from these rooms shall be installed in conduit that extends a minimum of 12" beyond the mechanical room wall. Remote satellite boxes used for housing control transformers shall be located above accessible ceilings of Corridors within 10 feet of mechanical rooms. Control transformers shall not be installed above ceilings of limited access areas such as offices, conference rooms, office suites, etc. or above non-accessible ceilings.

E. All plenum rated cabling run in standard drywall construction will be run inside the wall in new or existing conduit which extends six inches above the top plate of the wall and exiting the wall through standard wall boxes.

F. On wall constructed of solid concrete, cinder block or plaster, cables will be run in concealed conduit, surface wire mold or other approved raceway.

G. No ceiling tiles will be removed or holes punched out to accommodate cable penetration into a room.

H. Cabling shall be bundled neatly and well secured using nylon zip straps. It shall not be wrapped around piping or conduit. Support cabling at walls, to sub-ceiling or structural steel with wall locks or clamps. Cabling shall not be installed with excessive slack.

I. Cables requiring crimp-on connectors must have those connectors attached with an appropriate and recommended specialized crimping tool.

J. Identify each item, mounted on the face of a control panel, with a label (1/4" letters minimum).

K. Thermostats or sensors mounted on outside walls shall be mounted on an insulated mounting base (or equal).

L. All sensor elements in water lines shall be installed in separable wells, packed with heat conductive compound.

1.10 SYSTEM PERFORMANCE

A. Performance Standards. The system shall conform to the following:

1. Graphic Display. The system shall display a graphic with 20 dynamic points with all current data within 20 seconds.
2. Graphic Refresh. The system shall update a graphic with 20 dynamic points with all current data within 20 seconds.
3. Object Command. The maximum time between the command of a binary object by the operator and the reaction by the device shall be less than 5 seconds. Analog objects should start to adjust within 5 seconds.
4. Object Scan. All changes of state and change of analog values will be transmitted over the high-speed network such that any data used or displayed at a controller or workstation will be updated within 60 seconds.
5. Alarm Response Time. The maximum time from when an object goes into alarm to when it is annunciated at the workstation shall be 20 seconds.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Performance. Digital controllers shall be able to execute DDC PID control loops at a selectable frequency of at least once per second. The controller shall scan and update the process value and output generated by this calculation at this same frequency.
8. Multiple Alarm Annunciation. All workstations on the network must receive alarms within 5 seconds of each other.
9. Reporting Accuracy. The system shall report all values with an end-to-end accuracy as listed or better than those listed below:

Measure Variable	Reported Accuracy
Space Temperature	±1ºF
Ducted Air	±1ºF
Outside Air	±2ºF
Dew point	±3ºF
Water Temperature	±1ºF
Relative Humidity	±5% RH
Water Flow	±5% of full scale
Airflow (terminal)	±10% of reading
Airflow (measuring stations)	±5% of full scale
Air Pressure (ducts)	±0.1 "W.G.
Air Pressure (space)	±0.01 "W.G.
Water Pressure	±2% of full scale (absolute or differential)
Electrical	5% of reading (A, V, W, Power factor)
Carbon Dioxide (CO2)	±5% of reading

10. Stability of Control. Control loops shall maintain measured variable at set point within the tolerances listed below:

Controlled Variable Medium	Control Accuracy	Range of
Air Pressure	±0.2" w.g.	0-6" w.g.
	±0.01" w.g.	-0.1 to 0.1" w.g.
Airflow	± 5% of full scale	
Temperature	±1.0ºF	
Humidity	±5% RH	
Fluid Pressure	±1.5 psi	1-150 psi
	±1.0" w.g.	0-50"w.g.

differential

1.11 WORK BY OTHERS

A. Automatic Valves: Installed under applicable piping section under supervision of the temperature control subcontractor. All reducers and fittings necessary to install smaller than pipe size valves shall be furnished and installed under applicable piping sections.

B. Automatic Dampers: Installed under Division 23, Air Distribution System, under supervision of the temperature control subcontractor.

C. Smoke detectors shall be furnished and installed by the Division 26 contractor. The temperature controls subcontractor shall be responsible for interlock wiring between the smoke detectors and the air handling unit safety circuits.

D. Motor starters shall be furnished and installed by the Division 26 contractor. The temperature controls subcontractor shall be responsible for all wiring necessary involving the starter to perform the sequence of operation specified.

E. All line voltage to each DDC controller shall be provided by the Division 26 contractor.

1.12 QUALITY ASSURANCE

A. Ten (10) copies of shop drawings of the entire control system shall be submitted and shall consist of a complete list of equipment and materials, including manufacturer's catalog data sheets and installation instructions. Shop drawings shall also contain complete wiring and schematic diagrams, software descriptions, calculations, and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings.

B. A complete written Sequence of Operation as well as a hard copy graphical depiction of the application control programs shall also be included with the submittal package. Device identification as shown on the control schematics and wiring diagrams shall be referenced in the written Sequence of Operation.

C. Listing and explanation of both standard and user defined configuration parameters for the device.

D. System Architecture: Provide a schematic diagram of the Local Area Network and a controls network architecture diagram indicating supervisory controllers and Graphical User Interface(s). This should be

accompanied by explicit information regarding configuration of Routers, Bridges and Repeaters. Each schematic shall have all control points labeled. The schematic shall graphically show all control elements. The point name format shall be approved by the Engineer before any drawing or programming proceeds.

1.13 WARRANTY

A. The temperature control system contractor shall provide a one (1) year warranty that will commence from the Date of Substantial Completion.

B. The contractor shall respond during normal business hours to the job site within a 24 hour period for any emergency relating to the control system during the warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Johnson Controls, Inc.; Controls Group. No Exceptions.

2.2 GENERAL

A. All materials and equipment used shall be standard components, of regular manufacture for this application. All systems and components shall have been thoroughly tested and proven in actual use.

B. All products used in this project shall be new, currently under manufacture, and shall be applied in similar installations for a minimum of 2 years. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner's Representative in writing. Spare parts shall be available for at least 5 years after completion of this contract.

2.3 MATERIALS

A. Wiring and Conduit:

1. All wire shall be copper and meet the minimum wire size and insulation class listed below:

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 volt
Communications	Per Mfr. Recommendations	

2. Power and Class One wiring may be run in the same conduit. Class Two and Three wiring and communications wiring may be run in the same conduit.
3. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.
4. Where wiring is required to be installed in conduit, EMT shall be used. Conduit shall be minimum ½ inch galvanized EMT. Watertight compression fittings shall be used. Provide conduit seal off fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.

5. Flexible metallic conduit (max. 3 feet) shall be used for connections to controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.
6. Junction boxes shall be provided at all cable splices, equipment terminations, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasketed covers.

A. Damper and Valve Actuators:
1. Control air damper actuators shall be electric, low voltage (24 VAC) utilizing a 4-20 mA modulating control signal as required by the sequence of operation. Each actuator shall incorporate a spring return to position the dampers to their normal positions upon a loss of the 24 VAC control power. Control air damper actuators shall be properly sized to provide sufficient torque to their respective dampers throughout the actuator's operating range. All control air damper actuators shall be mounted outside of the air stream. Provide low leakage controls dampers to prevent air leakage for better pressure control of the zone. Provide fast acting actuators for better smoke purge reaction time.
2. Valve actuators for heating water and chilled water systems shall be electric. Operators shall be sized to operate their appropriate valves with sufficient reserve power to provide smooth modulating action or two position action as specified.

B. Control Panels
1. All application specific direct digital controllers, not specifically designed for direct mounting on the equipment served, shall be installed in NEMA 1 enclosures. Enclosures shall be of suitable size to accommodate all power supplies, relays and accessories required for the application. Each enclosure shall include a perforated subpanel for direct mounting on the enclosure devices.

C. Temperature Sensors:
1. Duct/Wall Sensors:
   a. As required by the sequence of operation, provide either 1,000 OHM Balco or 10K OHM Thermistor type sensors. Where the element is used for sensing mixed air or coil discharge temperatures and/or the duct cross-sectional area is in excess of 14 square feet, the element shall be of the averaging type. Where temperature elements are used for sensing liquid temperatures, they shall be furnished with separable stainless steel wells. Cold Deck and Hot Duct temperature sensor product shall be a Johnson Controls TE-6311M-1. Mixed air temperature sensor product shall be a Johnson Controls TE-6316M-1. Discharge air temperature sensors for zone sensors shall be Johnson Controls NS-BTN7001-0
2. Space Temp/Humidity Sensors:
   a. Space temperature/humidity sensors shall be Resistance temperature devices (RTD) or thermistor equipped with set point adjustment, override switch, and communication port. Humidity accuracy shall be 3%. LCD shall be provided for the temperature and the humidity. Product shall be a Johnson Controls NS-BHB7002-0.
3. Binary Temperature Devices:
   a. Low-voltage space thermostat shall be 24 V, bimetal-operated, snap action type, with either adjustable or fixed anticipation heater, concealed setpoint adjustment, 55°F to 85°F setpoint range, 2°F maximum differential, and vented ABS plastic cover.
   b. Line-voltage space thermostat shall be bimetal-actuated, open contact or bellows-actuated, enclosed, snap-switch type, or equivalent solid-state type, with heat anticipator, UL listed for electrical rating, concealed setpoint.
   c. Low-limit thermostats. Low-limit thermostats shall be vapor pressure type with an element 20 ft minimum length. Element shall respond to the lowest temperature sensed by any 1 ft section. The low-limit thermostat shall be manual reset only. Product shall be a Johnson Controls A70HA-1C. This shall be installed on the hot deck and cold deck coils.

D. Analog Current Sensors:

1. As required by the sequence of operation, provide split-core, sensors for indication of equipment amperage. Span shall be adjustable for improved resolution. Current sensors shall incorporate trip indication LED's and shall be sized for proper operation with equipment they serve. Current sensors and installation to be provided under work of this section.

E. Pressure Sensors:
1. Differential pressure type switches shall be UL Listed, SPDT snap acting, pilot duty rated, NEMA 4 enclosure, with scale range and differential suitable for intended applications, or as shown.
2. Differential pressure sensors used for sensing pressure in the ductwork shall be Johnson Controls DPT2641-005D-1 with a FTG18A-600R.
3. As required by the sequence of operation, provide a differential pressure switch across each air handling unit filter section for unit filter alarm indication. Product shall be a Johnson Controls P32AC-2C with a FTG18A-600R.
4. Differential pressure sensors used for high static pressure in duct work shall be a Johnson Control AFS-460 with a FTG18A-600R.

F. Duct Temperature/Humidity Sensor:
1. The temperature and humidity combination sensor shall be used in calculated enthalpy for the economizer function. Product shall have 3% accuracy with a 1k Ohm nickel temperature sensor. Product shall be Johnson Control HE-67N3-0N00P. This device will be installed in the return air and outside air duct work.

G. Damper Actuators
1. The damper actuators shall be incremental, non spring return, with a torque of 35 lb*in, and a built in pressure differential transmitter. The damper actuators shall be a Johnson Controls M9104-AGS-2N.

2.4 DDC EQUIPMENT

A. Workstation Client Hardware Stations: The system shall be capable of supporting clients using a standard Web browser such as Internet Explorer™ operating on any standard computer that supports the current version of Internet Explorer™.

B. Web Browser Clients:
1. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface. Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.
2. The Web browser client shall support at a minimum, the following functions:
   a. User log-on identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
   b. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.
   c. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
   d. Storage of the graphical screens shall be in the Building Control Units (BC), without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
   e. Real-time values displayed on a Web page shall update automatically without requiring a manual "refresh" of the Web page.
   f. User's shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:

1) Modify common application objects, such as schedules, calendars, and set points in a graphical manner.
2) Schedule times will be adjusted using a graphical slider, without requiring any keyboard entry from the operator.
3) Holidays shall be set by using a graphical calendar, without requiring any keyboard entry from the operator.
4) Commands to start and stop binary objects shall be done by right-clicking the selected object and selecting the appropriate command from the pop-up menu.
5) View logs and charts.
6) View and acknowledge alarms.
7) The system shall provide the capability to specify a user's (as determined by the log-on user identification) home page. Provide the ability to limit a specific user to just their defined home page. From the home page, links to other views, or pages in the system shall be possible, if allowed by the system administrator.
8) Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

C. Control Units General:
1. Provide an adequate number of control units to achieve monitoring and control of all data points specified and necessary to satisfy the sequence of operation for all mechanical systems shown on the plans. Provide a minimum of one separate controller for each AHU or other HVAC system. Multiple DDC controllers may control one system provided that all points associated with individual control loops are assigned to the same DDC controller. Points used for control loop reset such as outside air or space temperature are exempt from this requirement. Each of the following panel types shall meet the following requirements.
2. Controllers shall be suitable for the anticipated ambient conditions.
3. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at -40°F to 140°F and 5 to 95% RH, non condensing.
4. Controllers used in conditioned ambient space shall be mounted in dust-proof enclosures, and shall be rated for operation at 32°F to 122°F and 5 to 95% RH, non condensing.
5. Serviceability: Provide diagnostic LEDs for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
6. Memory: The Control Units shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.
7. Diagnostics: The Building Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall assume a predetermined failure mode and generate an alarm notification.
8. Immunity to power and noise: Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 3 ft.
9. Automatic staggered restart of field equipment after restoration of power and short cycle protection.

D. Supervisory Network Engine (SNE):
1. The Supervisory Network Engine (SNE) shall provide the interface between the LAN or WAN and the field control devices, and provide global supervisory control functions over the control devices connected to the UNC. It shall be capable of executing application control programs to provide:
   a. Calendar functions
   b. Scheduling
   c. Trending
   d. Alarm monitoring and routing
   e. Time synchronization by means of an Atomic Clock Internet site including automatic synchronization
   f. Integration data and BACnet controller data

2. The Supervisory Network Engine (SNE) must provide the following hardware features as a minimum:
   a. One Ethernet Port – 10/100 Mbps
   b. One RS-232 port
   c. Battery Backup
   d. Flash memory for long term data backup (If battery backup or flash memory is not supplied, the controller must contain a hard disk with at least 1 gigabyte storage capacity)
3. SNE shall provide the capability for multiple user access to the system and support for relational database access (ODBC, SQL or IBM). A database resident on the NAE shall be ODBC compliant database or must be capable of supporting an ODBC data access mechanism to read and write data stored within it.
4. SNE shall provide the capability to support standard Web browser access via the Intranet/Internet. It shall support a minimum of 4 simultaneous users.
5. Event Alarm Notification and Actions:
   a. The SNE shall provide alarm recognition, storage; routing, management, and analysis to supplement distributed capabilities of equipment or application specific controllers.
   b. The SNE shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up telephone connection, or wide-area network.
   c. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but limited to:
      1) To alarm
      2) Return to normal
      3) To fault
   d. Provide for the creation of a minimum of eight of alarm classes for the purpose of routing types and or classes of alarms, i.e.: security, HVAC, Fire, etc.
   e. Provide timed (schedule) routing of alarms by class, object, group, or node.
   f. Provide alarm generation from binary object “runtime” and /or event counts for equipment maintenance. The user shall be able to reset runtime or event count values with appropriate password control.
   g. Control equipment and network failures shall be treated as alarms and annunciated.
   h. Alarms shall be annunciated in any of the following manners as defined by the user.
   i. Email of the complete alarm message to multiple recipients. Provide the ability to route and email alarms based on:
      1) Day of week
      2) Time of day
      3) Recipient
   j. Pagers via paging services that initiate a page on receipt of email message.
   k. The following shall be recorded by the SNE for each alarm (at a minimum):
      1) Time and date
      2) Location (building, floor, zone, office number, etc.)
      3) Equipment (air handler #, accessway, etc.)
      4) Acknowledge time, date, and user who issued acknowledgement.
      5) Number of occurrences since last acknowledgement.
   l. Alarm actions may be initiated by user defined programmable objects created for that purpose.
   m. Defined users shall be given proper access to acknowledge any alarm, or specific types or classes of alarms defined by the user.
   n. Provide a “query” feature to allow review of specific alarms by user defined parameters.
   o. A separate log for system alerts (controller failures, network failures, etc.) shall be provided and available for review by the user.
   p. An Error Log to record invalid property changes or commands shall be provided and available for review by the user.

E. General Purpose Application Controllers (CGM04060 & CGM09090):

1. Standalone DDC panels shall be microprocessor-based, multi-tasking, multi-user, real-time digital control processors. Each standalone DDC panel shall consist of modular hardware with plug-in enclosed processors, communication controllers, power supplies, and input/output modules. A sufficient number of controllers shall be supplied to fully meet the requirements of this Specification and the attached point list.
2. Hardware Overrides – As indicated in the point schedule, the operator shall have the ability to manually override automatic or centrally execute commands.
3. Hardware Override Monitoring – DDC panels shall monitor the status or position of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited. DDC panels shall also collect override activity information for daily and monthly reports.

F. VAV Box Controller
1. The VAV Box Controller (hereafter referred to as CVM) shall provide both standalone and networked DDC of pressure-independent, VAV terminal units.
2. The CVM controller shall be a fully programmable, digital controller that communicates via BACnet MS/TP protocol.
   a. The CVM shall support BACnet Standard ANSI/ASHRAE 135.
      1) The CVM shall be BTL listed/certified.
      2) The CVM shall be tested and certified as a BACnet Advanced Application Controller (B-AAC).
      3) A BACnet Protocol Implementation Conformance Statement shall be provided for the CVM.
      4) The Conformance Statement shall be submitted 10 days prior to bidding.
3. The CVM shall employ finite state programming to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
4. The CVM shall include an integral real-time clock and support time-based tasks which enables these equipment controllers to monitor and control:
   a. Schedules
   b. Calendars
   c. Alarms
   d. Trends
5. The CVM can continue time-based monitoring when offline for extended periods of time from a network.
6. The CVM shall include an integral differential pressure transducer and damper actuator. An additional configuration option shall be available that also includes an integral potentiometer for actual damper position feedback. All components shall be connected and mounted as a single assembly, removable as one piece.
7. The integral damper actuator shall be a fast response stepper motor capable of stroking 90 degrees in 60 seconds for quick damper positioning to speed commissioning and troubleshooting tasks.
8. The CVM shall have the ability to automatically calibrate the flow sensor to eliminate pressure transducer offset error due to ambient temperature / humidity effects.
9. The CVM can operate as a stand-alone controller in applications that do not require a networked supervisory device or for network applications where it is preferred to have the scheduling, alarming, and/or trending performed locally in the equipment controllers.

PART 3 - EXECUTION

3.1 INSTALLATION AND WORKSMANSHIP

A. Install equipment, piping and wiring raceway parallel to the building lines (i.e., horizontal, vertical and parallel to walls) wherever possible.

B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.

C. Install all equipment in readily accessible locations as defined by Chapter 1, Article 100, Part A of the National Electric Code (NEC).

D. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.

E. All equipment, installation and wiring shall comply with acceptable industry specifications and standards for performance, reliability and compatibility and be executed in strict adherence to local codes and standard practices.

3.2 ELECTRICAL INTERLOCKS

A. All electrical interlocks shall be provided as specified. All electrical interlocks shall be made by means of motor starters or shall be accomplished by separate relays. No motor power lead shall be utilized in an interlock circuit. All interlocked starters with disconnect switches shall be provided with auxiliary contacts on the disconnect switch so that interlocking circuits are interrupted when the disconnect switch is in the off position.

3.3 OWNERSHIP OF PROPRIETARY MATERIAL

A. The owner shall sign a copy of the manufacturer's standard software and firmware licensing agreement as a condition of this contract. Such license shall grant use of all programs and application software to owner as defined by the manufacturer's license agreement, but shall protect manufacturer's rights to disclosure of trade secrets contained within such software. All project developed software and documentation shall become the property of the owner. These include, but are not limited to project graphic images, record drawings, project database, project specific application programming code, and all other associated documentation.

3.4 TRAINING

A. Provide a minimum of 8 hours of on-site training throughout the contract period for personnel designated by the Owner. Train the designated staff of Owners Representative and Owner to enable them to:
1. Proficiently operate the system.
2. Understand control system architecture and configuration.
3. Understand DDC system components.
4. Understand system operation, including DDC system control and optimizing routines (algorithms).
5. Operate the workstation and peripherals.
6. Log on and off the system.
7. Access graphics, point reports, and logs.
8. Adjust and change system set points, time schedules, and holiday schedules.
9. Recognize malfunctions of the system by observation of the printed copy and graphical visual signals.
10. Understand system drawings, and Operation and Maintenance manual.
11. Understand the job layout and location of control components.
12. Access data from DDC controller.
13. Operate portable operator's terminals.

PART 4 - SEQUENCE OF OPERATIONS

4.1 SINGLE DUCT VAV BOX WITH HOT WATER RE-HEAT

A. OCCUPIED MODE: When the zone temperature is between the occupied heating and cooling setpoints the primary air damper will be at the minimum CFM and there will be no mechanical heating. On a rise in zone temperature above the cooling setpoint, the primary air damper will increase the CFM and there will be no mechanical heating. On a drop in zone temperature below the heating setpoint, the re-heat coil will be used to maintain the zone temperature and the damper is controlled to provide a minimum CFM.

B. UNOCCUPIED MODE: When in this mode, while the zone temperature is between the unoccupied heating and cooling setpoints, the primary air damper will be at the minimum CFM and there will be no mechanical heating. On a rise in zone temperature above the unoccupied cooling setpoint, the primary air damper will increase the CFM and there will be no mechanical heating. On a drop in zone temperature below the unoccupied heating setpoint, the re-heat coil will be used to maintain the zone temperature and the primary air damper will be a the minimum.

C. DISCHARGE AIR TEMPERATURE: A discharge air temp sensor is provided on each box for monitoring purposes.

D. ZONE TEMPERATURE SENSOR: The zone temperature sensor shall have display and adjustable setpoints.

4.2 DUAL DUCT VAV BOX

A. COLD DUCT DAMPER: During the occupied mode, the damper will modulate to provide cold air flow at or below maximum cold duct flow setpoint. Airflow setpoint will be determined from zone temperature and cooling setpoint control loop. On a rise in zone temperature cold air flow will increase. On a drop in zone temperature cold air will decrease until the damper is closed.

B. HOT DUCT DAMPER: During occupied mode, the damper will modulate to provide hot air flow at or below maximum hot duct flow setpoint. Airflow setpoint will be determined from zone temperature and heating setpoint control loop. On a drop in zone temperature how air flow will increase. On a rise in zone temperature cold air flow will decrease until the damper is closed.

C. TOTAL AIRFLOW: The total sum of hot deck and cold deck airflows will remain constant as scheduled.

D. UNOCCUPIED MODE: During the unoccupied mode of operation the sequence above will apply. However the box will setback and setup the zone cooling and heating setpoints as well as reduce the air flow requirements.

E. DISCHARGE AIR TEMP SENSOR: A discharge air temp sensor is provided on each box for monitoring purposes.

F. ZONE TEMPERATURE SENSOR: The zone temperature sensor shall have display and adjustable setpoints.

4.3 PHOENIX BACnet INTEGRATION

A. Phoenix system shall consist of supply and return lab valves along with temperature, humidity and pressure sensors.

B. Phoenix to provide, install, and configure BACnet gateway.

C. Johnson Controls shall integration to discover BACnet points and objects creating a graphical user interface.

4.4 RETURN FAN

A. OCCUPIED MODE: When the pharmacy is in occupied mode the return fan shall be given a run command and run continuous. If a run command is given and the status does not match the command, an alarm shall be generated.

B. UNOCCUPIED MODE: When the pharmacy is unoccupied, the return fan shall be given a stop command.

4.5 ADDITIONAL POINTS

A. Monitor filter status on HEPA supply diffusers

B. Pressure Monitor: Monitor pressure for Pedi Pharmacy and alarm on a negative pressure below positive setpoint.

END OF SECTION 230900

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

(FOR REFERENCE ONLY – PROVIDED BY OWNER)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.
b. Variable-air-volume systems.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 SUBMITTALS

A. Qualification Data: Submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Submit the Contract Documents review report as specified in Part 3.

C. Certified TAB reports.

D. Sample report forms.

E. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.

3. Application.
4. Dates of use.
5. Dates of calibration.

1.5 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC NEBB or TABB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC NEBB or TABB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC NEBB or TABB as a TAB technician.

B. TAB Conference: Meet with Architect on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Coordination and cooperation of trades and subcontractors.
d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

N. Examine system pumps to ensure absence of entrained air in the suction piping.

O. Examine operating safety interlocks and controls on HVAC equipment.

P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Division 23 Section "Air Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.

6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

    a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within indicated airflow.

4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.

6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record final fan-performance data.

3.7 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 5 percent.
2. Air Outlets and Inlets: Plus or minus 5 percent.

3.8 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.9 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft..
g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

F. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

G. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.10 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Architect.
3. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.11 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 230595 – MECHANICAL, FACILITY STARTUP-COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The purpose of this section is to specify Division 23 responsibilities and participation in the commissioning process. Note that point-to-point commissioning of all control functions and complete documentation is the responsibility of the temperature control contractor under Division 23, and shall be included in the Division 23 contract.

B. Commissioning is the responsibility of the commissioning agent (CA) under separate contract with University Medical Center. The CA is responsible to provide a Test Engineer to commission the facilities. The construction manager (CM) and his subcontractors shall provide all support required for start-up, testing, and commissioning. This section is intended to provide an indication of the tests, which must be performed by the Contractor prior to verification by the Owner's Representative and the Commissioning Agent. The commissioning process requires Division 23 participation to ensure all portions of the work have been completed in a satisfactory and fully operational manner.

C. Work of Division 23 includes:

1. Start-up and testing of the equipment.
2. Assistance in testing, adjusting and balancing, including furnishing additional sheaves and dampers as required.
3. Operating equipment and systems as required for commissioning tests.
4. Providing qualified personnel for participation in commissioning test, including seasonal testing required after the initial commissioning.
5. Provide equipment, materials, and labor necessary to correct deficiencies found during the commissioning process, which fulfill contract and warranty requirements.
6. Providing operation and maintenance information and as-built drawings to the Test Engineer for verification, organization, and distribution.
7. Providing assistance to the Test Engineer to develop and edit system operation descriptions.
8. Providing training for the systems specified in this Division with coordination by the Test Engineer, Owner's Representative and Commissioning Agent.

1.3 RELATED WORK

A. All start-up and testing procedures and documentation requirements specified within Division 23.

B. Cooperate with the test, adjust and balance (TAB) firm in the following manner:

1. Allow sufficient time before final commissioning dates so that testing, adjusting and balancing can be accomplished.

2. Put all heating, ventilating, and air conditioning equipment and systems into full operation and continue the operation during each working day of testing, adjusting and balancing and commissioning.
3. Provide labor and material to make corrections when required, without undue delay.
4. Include the cost of exchange sheaves and belts as may be required by the TAB firm.
5. Provide test holes in ducts and plenums where directed or necessary for pitot tubes to take air measurements and to balance the air systems. Test holes shall be provided with an approved removable plug or seal. At each location where ducts and plenums are insulated, test holes shall be provided with an approved extension and plug fitting.
6. Provide pressure and temperature taps as indicated on construction documents in locations as required by the TAB firm to adequately test and/or balance the hydronic systems.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Provide test equipment as necessary for start-up and commissioning of the mechanical equipment and systems. The TAB firm will provide the test equipment required to perform their services.

2.2 TEST EQUIPMENT – PROPRIETARY

A. Proprietary test equipment required by the manufacturer, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist the Test Engineer in the commissioning process. Proprietary test equipment shall become the property of the Owner upon completion of commissioning.

B. Identify the proprietary test equipment required in the test procedure submittals and in a separate list of equipment to be included in the operations and maintenance manuals.

PART 3 - EXECUTION

3.1 WORK PRIOR TO COMMISSIONING

A. Complete all phases of work so the system can be started, tested, adjusted, balanced, and otherwise commissioned. Division 23 has primary start-up responsibilities with obligations to complete systems, including all sub-systems so they are fully functional. This includes the complete installation of all equipment, materials, pipe, duct, wire, insulation, controls, etc., per the contract documents and related directives, clarifications, change orders, etc.

B. A commissioning plan will be developed by the Test Engineer and approved by the Commissioning Agent. Division 23 is obligated to assist the Test Engineer in preparing the commissioning plan by providing all necessary information pertaining to the actual equipment and installation. If the system modifications/clarifications are in the contractual requirements of this and related sections of work, they will be made at no additional cost to the Owner. If the Contractor initiated system changes have been made that alter the commissioning process; the Test Engineer will notify the Commissioning Agent and Owner’s Representative for approval.

C. Specific pre-commissioning responsibilities of Division 23 are as follows:

1. Factory start-up services for the following items of equipment:

a. Air-handling equipment and exhaust fans.
b. Heating equipment.
c. Cooling equipment.
d. Plumbing equipment.
e. Pumps.

2. Normal start-up services required bringing each system into a fully operational state. This includes cleaning, purging, leak testing, motor rotation check, control sequences of operation, full and part load performance, etc. The TAB firm will not begin TAB work until each system is complete, including normal contractor start-up. The Test Engineer will not begin commissioning process until each system is complete, including normal contractor start-up and the TAB work has been completed.

D. Commissioning is intended to begin upon completion of a system. Commissioning may proceed prior to the completion of systems, or sub-systems, and will be coordinated with the Test Engineer. Start of commissioning before system completion will not relieve Division 23 from completing those systems as per the schedule.

3.2 PARTICIPATION IN COMMISSIONING

A. Provide skilled technicians to start up all systems within Division 23. These same technicians shall be made available to assist the Test Engineer and Commissioning Agent in completing the commissioning program as it relates to each system and their technical specialty. Work schedules; time required for testing, etc., will be requested and coordinated by the Test Engineer. Division 23 will ensure that the qualified technician(s) are available and present during the agreed upon schedule and for sufficient duration to complete the necessary tests, adjustments, and/or problem resolutions.

B. System problems and discrepancies may require additional technician time, Test Engineer time, Commissioning Agent time, redesign and or reconstruction of systems and system components. The additional technician time shall be made available for the subsequent commissioning periods until the required system performance is obtained.

C. The Owner’s Representative and Commissioning Agent reserve the right to judge the appropriateness and qualifications of the technicians relative to each item of equipment or system. Qualifications of technicians include expert knowledge relative to the specific equipment involved, adequate documentation and tools to service/commission the equipment, and an attitude/willingness to work with the Test Engineer to get the job done.

3.3 WORK TO RESOLVE DEFICIENCIES

A. In some systems, misadjustments, misapplied equipment and/or deficient performance under the varying loads will result in additional work being required to commission the systems. This work will be completed under the direction of the Architect and Owner’s Representative, with input from the Contractor, equipment supplier, Test Engineer, and Commissioning Agent. Whereas all members will have input and the opportunity to discuss the work and resolve the problems, the Architect will have final jurisdiction on the necessary work to be done to achieve performance.

B. Corrective work shall be completed in a timely fashion to permit timely completion of the commissioning process. Experimentation to render system performance will be permitted. If the Commissioning Agent deems the experimentation work to be ineffective or untimely as it relates to the commissioning process, the Commissioning Agent will notify the Owner indicating the nature of the problem, expected steps to be taken, and the deadline for completion of activities. I deadlines pass without resolution of the problem, the Owner reserves the right to obtain supplementary services and/or equipment to resolve the

problem. Costs incurred to solve the problems in an expeditious manner will be the Contractor's responsibility.

3.4 SEASONAL COMMISSIONING AND OCCUPANCY VARIATIONS

A. Seasonal commissioning pertains to testing under full-load conditions during peak heating and peak cooling seasons, as well as part-load conditions in the spring and fall. Initial commissioning will be done as soon as contract may be undertaken at any time thereafter to ascertain adequate performance during the different areas.

B. All equipment and systems will be tested and commissioned in a peak season to observe full-load performance. Heating equipment will be tested during winter design extremes. Cooling equipment will be tested during summer design extremes, with a fully occupied building. Each Contractor and supplier shall be responsible to participate in the initial and the alternate peak seasons test of the systems required to demonstrate performance; as scheduled by the Test Engineer, with three day (minimum) advance notification.

C. Subsequent commissioning may be required under conditions of minimum and/or maximum occupancy or use. All equipment and systems affected by occupancy variations will be tested and commissioned at the minimum and peak loads to observe system performance. The Contractor will be responsible to participate in the occupancy sensitive testing of systems to provide verification of adequate performance.

3.5 RECOMMISSIONING

A. After the initial and peak season commissioning is completed, there may be additional work required to serve new or revised loads. This work is not part of the contract.

3.6 TRAINING

A. Participate in the training of the Owner's engineering and maintenance staff on each system and related components. Training, in part, will be conducted in a classroom setting, with system and component documentation, and suitable classroom training aids. Note that all training shall be videotaped in DVD format.

B. Training will be conducted jointly by the Test Engineer, Commissioning Agent, Owner's Representative, the design engineers, the Contractor, and the equipment vendors. The Test Engineer will be responsible for highlighted system peculiarities specific to this project.

3.7 SYSTEMS DOCUMENTATION

A. In addition to the requirements of Division 1, update contract documents to incorporate field changes and revisions to system designs to account for actual constructed configurations. All drawings shall be redlined on two sets. Division 23 as-built drawings shall include architectural floor plans, elevations and details, and the individual mechanical or electrical systems in relation to actual building layout.

B. Maintain as-built redlines as required by Division 1. Given the size and complexity of this project, red-line drawings at completion of construction, based on memory of key personnel, is not satisfactory. Continuous and regular red-lining of drawings is considered essential and mandatory.

3.8 MISCELLANEOUS SUPPORT

A. Division 23 shall remove and replace covers of mechanical equipment, open access panels, etc., to permit Contractor, Architect, and Owner's Representative to observe equipment and controllers provided. Furnish ladders and flashlights as necessary.

END OF SECTION 230595

SECTION 230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes insulating the duct services.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All-Service Duct Wrap.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

C. FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
2. Service Temperature Range: Minus 20 to plus 180 deg F.
3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
4. Color: White.

2.4 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.
5. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.6 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Width: 3 inches.
2. Thickness: 6.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.

5. Tensile Strength: 40 lbf/inch in width.
6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

B. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Width: 2 inches.
2. Thickness: 3.7 mils.
3. Adhesion: 100 ounces force/inch in width.
4. Elongation: 5 percent.
5. Tensile Strength: 34 lbf/inch in width.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Division 07 Section "Penetration Firestopping"firestopping and fire-resistive joint sealers.

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.

b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location for each duct system defined in the "Duct Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.8 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed ducts.
2. Indoor, exposed ducts.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.

7. Factory-insulated access panels and doors.

3.9 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Supply-air and Return-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2-1/5 inches thick and 0.75-lb/cu. ft. nominal density with an installed R-Value equal to R-6.0.
   a. Also, all existing medium pressure ducts through renovated areas of 2nd floor project shall have existing duct insulation removed, duct repaired, duct tested, then provided with new insulation throughout renovated areas.

END OF SECTION 230713

SECTION 230910 - CRITICAL HVAC CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes equipment for HVAC systems and components serving the operating rooms.

1.3 SCOPE

A. Critcal Airflow and Temperature Control System (CATCS) shall be furnished and installed to control the airflow into and out of isolation rooms and maintain room temperature setpoint. The CATCS shall vary the amount of make-up/supply air into the isolation room to operate at the lowest possible airflow rates necessary to maintain temperature control, achieve minimum ventilation rates and negative pressurization in relation to adjacent spaces. The CATCS shall be capable of operating as a standalone system or as a system integrated with the Building Management System (BMS).

B. The intent of this specification is to define the hardware, installation, and control requirements for CATCS.

C. All control equipment required to fulfill this specification shall be manufactured and provided by the CATCS equipment manufacturer.

D. Air valves and re-heat coil water control valves are provided under this section for installation by the Mechanical Contractor.

E. Installation of the Critical airflow and temperature control components (not to include air valves or re-heat coil water control valves), low voltage control cabling to include low voltage (less than 50 volts) power, sensor and communication is provided under this section. All power supplies, monitoring components, space and duct sensors, routers, control panels and ancillary components for a fully functioning CATCS shall be provided and installed.

F. Duct devices shall be installed by the Mechanical Contractor. Standard fittings, hangers, and ancillary devices required to install duct devices shall be provided by the Mechanical Contractor.

G. Equipment start-up shall be provided by factory certified personnel. Demonstrate system functionality as need for commissioning activities.

H. The CATCS shall digitally interface to the Central Building Management System (BMS) as provided by the temperature controls contractor. The CATCS Contractor shall provide a BACnet IP or MSTP interface device between the CATCS and the BMS, including standardized communications protocol software and data mapping tables as required. The Temperature Controls Contractor shall be responsible for software indigenous to the BMS, and graphic displays for the CATCS at the central BMS station.

I. If items in the specifications or drawings require clarification, the effected contractors shall contact the Architect/Engineer for clarification.

J. It shall be understood that the Drawings and Specifications describe the approximate locations of the work. Do not scale the drawings to determine exact positions and clearances. Obtain from Architect, Engineer, Commissioning Agent or the Owner any dimensions not shown.

K. Details of construction and of workmanship where not specifically described herein or indicated on the drawings shall be subject to the Engineer's or Owner's approval. It is the intent of these Specifications to provide complete systems, left in good working order, ready for operation, including necessary labor and materials, whether or not specifically shown on the Drawings or mentioned herein.

L. Before submitting proposals, examine the Specifications and all Drawings relating to the work and become fully informed as to the extent and character of the work and the relation of the work to that of other Sections. Examine the Drawings of other Sections to become familiar with all the problems and details of the building construction and to note conditions, which affect the work.

M. Any changes required in the ductwork, air handling equipment or any other mechanical systems, which would be required for the application of any proposed Critical Airflow equipment other than the specified "Base Bid" or "Basis of Design" shall be the responsibility of the Critical airflow control system supplier. Any additional engineering, sheet metal or mechanical equipment (i.e. upsized supply/exhaust systems) costs other than that as required by the "Basis of Design" shall be borne by the Critical airflow control system supplier. All changes shall be subject to prior approval by the Architect/Engineer.

1.4 APPLICATION

A. Provide CATCS based on Phoenix Controls Traccel Line for tracking pairs of supply and exhaust valves, single supply valves or single exhaust valves for areas where fume hoods are not present or high speed actuation is not required.

1.5 WARRANTY

A. Warranty shall commence upon the date of shipment and extend for a period of 36 months, whereupon any defects in materials or Critical airflow control system performance shall be repaired by the CATCS supplier at no cost to the owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Phoenix Controls Corp.

2. Accutrol

3. Other manufacturer systems will be considered via prior approval during bidding process.

2.2 SYSTEM PERFORMANCE REQUIREMENTS

A. Airflow Control System Operation Description – Traccel
1. Each space shall have a dedicated airflow control system. Each dedicated airflow control system shall support a minimum of 64 network controlled airflow devices.
2. The airflow and temperature control system shall maintain specific airflow (±5% of signal within one second of a change in duct static pressure) regardless of the magnitude of the pressure change, airflow change or quantity of airflow control devices on either the supply air or exhaust air manifold. Venturi valve operation range shall be 0.6" wc – 3.0"wc for medium pressure valves, 0.3"wc – 3.0"wc for low pressure valves. The airflow and temperarture control system shall use volumetric offset control to maintain room pressurization. The system shall maintain proper room pressurization polarity (negative or positive) regardless of any change in room/system conditions, such as point of use exhaust (i.e. snorkels) being manually shut-off by a user activated switch, or rapid changes in duct static pressure.
3. The airflow control system shall maintain specific airflow (±5% of signal) with a minimum 11 to 1 airflow turndown to ensure accurate pressurization at low airflow and assure maximum energy efficiency.
4. In the event of a power failure, airflow control devices shall fail to the last position and continue to maintain flow control within ±5% of signal within one second of a change in duct static pressure.

2.3 SYSTEM COMPONENTS

A. System Integration Device(s)
1. The System Integration device shall be a Phoenix Controls Integrator (PCI8000). The device shall be a standalone piece of hardware with embedded Niagara will be used for commissioning and configuration of venturi valves and ancillary components such as Fume Hood Displays, and Input Output (I/O) modules when connected to a Phoenix Controls Workbench, Room Manager, or Supervisor.
2. After the Room Level Interface is commissioned it shall provide a web based user interface for device, network, and platform diagnostics as well as a Test and Balance web application for zone balance and airflow validation. This device shall have an integral secure Wireless Access Point.
3. The device will also provide a means of integrating on an open BACnet network via IP, Ethernet, or MS/TP to be field selectable at time of commissioning.

B. Airflow Control Device - General
1. The airflow control device shall be a Phoenix Controls Accel II pressure independent venturi valve.
2. The valve assembly manufacturer's Quality Management System shall be registered to ISO 9001:2008.
3. Airflow control device shall be OSHPD tested and certified per 2013 CBC, 2012, IBC, ASCE 7-10, and ICC-ES-AC-156.
4. All Components of the valve, its controllers, and wiring shall be ROHS compliant.
5. The airflow control device shall be mechanically pressure independent over its specified differential static pressure operating range. An integral pressure independent assembly shall respond and maintain specific airflow within one second of a change in duct static pressure irrespective of the magnitude of pressure and/or flow change (within product specifications) or quantity of airflow controllers on a manifolded system.
6. The airflow control device shall maintain accuracy within ±5% of signal to set point over an airflow turndown range of no less than:
   a. 12.5 to 1 (medium pressure all valve sizes)
   b. 16 to 1 (medium pressure w/o 14" valve)
   c. 7 to 1 (low pressure all valve sizes)
   d. 11 to 1 (low pressure w/o 14" valve)

e. 8 to 1 (medium pressure shut-off all valve sizes)
f. 14 to 1 (medium pressure shut-off w/o 14" valve)
g. 5 to 1 (low pressure shut-off all valve sizes)
h. 9 to 1 (low pressure shut-off w/o 14" valve)

7. No minimum entrance or exit duct diameters shall be required to ensure accuracy and/or pressure independence.
8. No rotational/axial orientation requirements shall be required to ensure accuracy and/or pressure independence.
9. The airflow control device shall maintain pressure independence regardless of loss of power. "Electronically pressure independent" devices will not be acceptable.
10. Airflow control devices utilizing ASHRAE 130 minimum operating pressure as a rating for minimum design pressure at required flow will not be acceptable on basis on minimum operating pressure alone. Valve manufacturer will provide minimum required differential pressure in writing for each size valve they offer.
11. Airflow control device shall be able to achieve its maximum turndown ratio at its stated minimum operating differential pressure. I.E. if minimum operating pressure is 0.6" wc dp, a 10" air valve must be able to achieve its minimum of 50cfm and its maximum of 1000 cfm at stated 0.6" wc dp. Devices that require duct static pressure to be increased to achieve maximum flow shall not be acceptable.
12. The airflow control device shall be constructed of one of the following four types:
    a. Class A—The airflow control device for non-corrosive airstreams, such as supply and general exhaust, shall be constructed of 16-gauge aluminum. The device's shaft and internal "S" link shall be made of 316 stainless steel. The shaft support brackets shall be made of galvaneal (non shutoff valves) or 316 stainless steel (shutoff valves). The pivot arm shall be made of aluminum (for non shutoff valves) and 303/304 stainless (for shut off valves). The pressure independent springs shall be a spring-grade stainless steel. All shaft bearing surfaces shall be made of a PP (polypropylene) or PPS (polyphenylene sulfide) composite. Sound attenuating devices used in conjunction with general exhaust or supply airflow control devices shall be constructed using 24 gauge galvanized steel or other suitable material used in standard duct construction. No sound absorptive materials of any kind shall be used.
    b. Class B—The airflow control device for corrosive airstreams, such as fume hoods, shall have a baked-on, corrosion-resistant phenolic coating. The device's shaft shall be made of 316 stainless steel with a Teflon coating. The shaft support brackets shall be made of 316 stainless steel. The pivot arm and internal "S" link shall be made of 316 or 303 stainless steel. The pressure independent springs shall be a spring-grade stainless steel. The internal nuts, bolts and rivets shall be stainless steel. All shaft bearing surfaces shall be made of PP (polypropylene) or PPS (polyphenylene sulfide) composite.
13. Actuation
    a. For high speed electrically actuated VAV operation, a CE certified, UL Listed, IP56 rated for dust and water, electronic actuator shall be factory mounted to the valve. Loss of main power shall cause the valve to position itself in an appropriate failsafe state. Options for these failsafe states include: normally open-maximum position, normally closed-minimum position and fail-to-last position. This position shall be maintained constantly without external influence, regardless of external conditions on the valve (within product specifications).

       In fail safe conditions the Airflow Control Device must remain pressure independent and in control of airflow at its failed position. I.E. if a device fails in position at 500 cfm, the airflow control device must remain pressure independent regardless of having power/controller operating and will deliver the 500cfm at that given control point regardless of duct pressure. Airflow control devices with single or dual blades that fail in position or fail open will not be acceptable as the airflow delivered cannot be guaranteed due to device not being mechanically pressure independent.

b. During normal operation, the high speed actuated airflow control device shall initiate valve movement and achieve the commanded airflow value with no more than 5% overshoot or undershoot within 1 second or less.

c. For Standard Speed electrically actuated VAV operation, a CSA certified, UL recognized (IP54 rating and CE certification optional on single valves, standard on dual valves) electronic actuator shall be factory mounted to the valve. The fail-safe state for standard speed operation valves shall be fail to last position unless otherwise noted.

In fail-safe conditions the Airflow Control Device must remain pressure independent and in control of airflow at its failed position. I.E. if a device fails in position at 500 cfm, the airflow control device must remain pressure independent regardless of having power/controller operating and will deliver the 500cfm at that given control point regardless of duct pressure. Airflow control devices with single or dual blades that fail in position or fail open will not be acceptable as the airflow delivered cannot be guaranteed due to device not being mechanically pressure independent.

d. During normal operation, the standard speed actuated airflow control device shall initiate valve movement and achieve the commanded airflow value with no more than 5% overshoot or undershoot within 60 seconds (90 seconds for a shutoff valve from shutoff to maximum flow or vice Versa).

i. Standard speed actuation should not be used for valves that are connected to VAV fume hoods.
ii. Standard speed actuation can be used on 2-state fume hoods or vented cabinets or snorkels with on/off conditions.
iii. Constant volume valves do not require actuators.

14. The controller for the airflow control devices shall be microprocessor based and operate using peer-to-peer control architecture. The room-level airflow control devices shall function as a standalone network. The room-level control network shall utilize a LonTalk communications protocol.
15. There shall be no reliance on external or building-level control devices to perform room-level control functions. Each Critical control system shall have the capability of performing fume hood control, pressurization control, standard and advanced temperature control, humidity control, and implement occupancy and emergency mode control schemes. A Room controller or PLC performing these functions shall not be acceptable.
16. The CATCS shall have digital integration with the BMS or BAS. If digital integration device, room controller, Critical space controller or similar is lost or offline or fails then the valve controllers shall have distributed controllability and will keep the basic room functions of zone balance, temperature, humidity control, offset control, etc. operating to maintain a safe and comfortable zone.
17. NVLAP Accreditation (Lab Code 200992-0)
    a. Each airflow control device shall be factory characterized on air stations NVLAP Accredited (a program administered by NIST) to ISO/IEC 17025:2005 standards.
    b. Each airflow control device shall be factory characterized to the job specific airflows as detailed on the plans and specifications using NVLAP Accredited air stations and instrumentation having a combined accuracy of no more than ±1% of signal (5,000 to 250cfm), ±2% of signal (249 to 100cfm) and ±3% of signal (199 to 35cfm). Electronic airflow control devices shall be further characterized and their accuracy verified to ±5% of signal at a minimum of 48 different airflows across the full operating range of the device.
    c. Each airflow control device shall be marked with device-specific factory characterization data. At a minimum, it should include the room number, tag number, serial number, model number, eight-point characterization information (for electronic devices), date of manufacture and quality control inspection numbers. All information shall be stored by

the manufacturer for use with as-built documentation. Characterization data shall be stored indefinitely by the manufacturer and backed up off site for catastrophic event recovery.

C. Exhaust And Supply Airflow Device Controller
1. The airflow control device shall be a microprocessor-based design and shall use closed loop control to linearly regulate airflow based on a digital control signal. The device shall generate a digital feedback signal that represents its airflow. The controller shall be factory installed on the valve assembly, and factory tested as an assembly.
2. During normal operation the airflow control device shall initiate valve movement and achieve the commanded airflow value with no more than 5% overshoot or undershoot within:
   a. 1 second or less with high speed actuation.
   b. 60 seconds for standard speed actuation (90 seconds from shutoff to max flow and vice versa).
3. The airflow control device shall store its control algorithms in non-volatile, re-writeable memory. The device shall be able to stand-alone or to be networked with other room-level digital airflow control devices using an industry standard protocol.
4. Room-level control functions shall be embedded in and carried out by the airflow device controller using distributed control architecture. Critical control functions shall be implemented locally; no separate room-level controller shall be required.
5. The airflow control device shall use industry standard 24 VAC power.
6. The airflow control device shall have provisions to connect a Phoenix Controls Workbench (WKB100) commissioning tool and every node on the network shall be accessible from any point in the system.
7. The airflow control device shall have built-in integral input/output connections that address fume hood control, temperature control, humidity control occupancy control, emergency control, and non-network sensors switches and control devices. At a minimum, the airflow controller shall have:
   a. Three universal inputs capable of accepting 0 to 10 VAC, 4 to 20 mA, 0 to 65 K ohms, or Type 2 or Type 3 10 K ohm @ 25 degree C thermistor temperature sensors.
   b. One digital input capable of accepting a dry contact or logic level signal input.
   c. Two analog outputs capable of developing either a 0 to 10 VAC @ 1 mA (10Kohm min) or 4 to 20 mA (500 ohm max) linear control signal.
   d. One Form C (SPDT) relay output capable of driving up to 1 A @ 24 VAC/VAC.
8. The airflow control device shall meet FCC Part 15 Subpart J Class A, CE, and CSA Listed per file #228219.
9. The airflow control device shall be ROHS compliant.

D. Two-Position Exhaust Airflow Control Device

The airflow control device shall maintain a factory characterized fixed maximum and minimum flow set point based on a remote contact/sash switch for electronic valves or a switched 0 to 20 psi pneumatic signal for pneumatic valves. Two-position devices requiring feedback shall generate a 0 to 10 volt feedback signal that is linearly proportional to its airflow. All two-position devices shall be either networked or hard-wired into the room-level network to be considered under pressurization control.

E. Critical Airflow Control Device

The airflow control device shall maintain a temperature set point by controlling the airflow and the reheat valve (if required) in response to a room temperature sensor. An additional output shall be provided for supplementary cooling or heating of the office space. If the office airflow supply device is not required for make-up airflow control for fume hoods, then the one-second speed of response and fail-safe conditions required of the CATCS shall not apply.

Hot deck and cold deck temperature control dampers upstream of the Supply Airflow Control device (venture valve) shall be equal to Potorff CD-25R low leakage damper suitable for medium and high pressure duct applications, shall include a damper actuator mounting bracket with

insulation standard. The damper actuator shall be modulating type, non-fail safe, and shall be provided under this section.

F. Constant Volume Airflow Control Device
   1. The airflow control device shall maintain a constant airflow set point. It shall be factory characterized and set for the desired airflow. It shall also be capable of field adjustment for future changes in desired airflow.
   2. Constant volume valves must be 100% mechanically pressure independent, and require no actuation to maintain set point.
   3. Constant volume valves shall have no required electronics to maintain set point

G. Room Pressure Monitors
   Each isolation and isolation ante room shall be provided with a Room Pressure Monitor equal to a Phoenix Controls APM2. Each monitor shall include a minimum 4.3" color touch screen TFT display, visual and audible alarming, message banner, door indicator status, and BACnet MSTP connection. Room sensors shall terminate in the ceiling/wall of each isolation/ante room with stainless wall plate probe.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The CATCS contractor shall install all routers and repeaters in an accessible location in or around the designated room.

B. The CATCS contractor shall install an appropriately sized and fused 24 Vac transformer suitable for NEC Class II wiring.

C. All cable shall be furnished and installed by the CATCS contractor. The CATCS contractor shall terminate and connect all cables as required. Cables specifically recommended by the Critical airflow controls manufacturer shall be utilized.

D. The mechanical contractor shall install all airflow control devices in the ductwork and shall connect all airflow control valve linkages.

E. The mechanical contractor shall provide and install all reheat coils, water control valves, duct fittings and transitions.

F. The mechanical contractor shall provide and install insulation as required.

G. The electrical contractor shall wire a dedicated, single phase 120vac power circuit to each control unit and/or wall-mounted power supply.

H. Low voltage (less than 50 Volts) NEC class 2 current limited circuits, communication, actuator and sensor cabling may be installed without conduit where located above lay-in ceilings and is concealed and accessible. Cabling shall be installed in a neat and workmanlike manner, secured to structural members parallel and perpendicular to building lines. All other wiring shall be installed in conduit per the applicable sections of the project specifications.

I. Plenum rated cable shall be utilized where the above ceiling space is considered a return air path.

J. Control transformers shall not be installed above non-accessible ceilings. The control transformer secondary shall have a disconnect switch a resettable circuit breaker.

K. On walls constructed of solid concrete, cinder block or plaster, cables will be run in concealed conduit, surface wire mold or other approved raceway.

L. Cabling shall be bundled neatly and well secured using nylon zip straps. It shall not be wrapped around piping or conduit. Support cabling at walls, to sub-ceiling or structural steel with wall locks or clamps. Cabling shall not be installed with excessive slack.

M. Cables requiring crimp-on connectors must have those connectors attached with an appropriate and recommended specialized crimping tool.

3.2 SYSTEM START-UP, TRAINING, AND SUPPORT

A. System start-up shall be provided by a factory-authorized representative of the Critical airflow control system manufacturer**. Due to the nature of the areas to be served by the CATCS, all start-up and warranty support shall be provided by full-time personnel of the representative, who have a minimum of 5 years start-up experience with the CATCS provided, and are normally officed within 50 miles of the project site**. Start-up shall include calibrating the fume hood monitor and any combination sash sensing equipment, where applicable. Start-up shall also provide electronic verification of airflow (fume hood/bio-safety cabinet exhaust, supply, make-up, general exhaust or return), system programming and integration to BMS (when applicable).

B. The balancing contractor shall be responsible for final verification and reporting of all airflows.

C. The Critical airflow control system supplier shall furnish a minimum of 8 hours of owner training by factory trained and certified personnel. The training will provide an overview of the job specific airflow control components, general procedures for verifying airflows of air valves and general troubleshooting procedures.

D. Operation and maintenance manuals, including as-built wiring diagrams and component lists, shall be provided for each training attendee.

E. It shall be the responsibility of the General Contractor to secure the room envelope sufficiently to maintain required pressure levels with the airflow volumes specified. The representative of the Critical Airflow Control Manufacturer shall advise the General Contractor of any condition which might compromise the ability of the room to achieve the specified pressure levels.

F. The representative of the Critical Airflow Control Manufacturer shall demonstrate to the engineer the ability of the controls to maintain setpoints in all modes of operation.

3.3 SEQUENCES OF OPERATION

A. Room Airflow Control Sequence of Operation:
1. Airflow and Temperature Controls in each isolation room consists of a supply air valve, hot-cold deck temperature control dampers or hot water reheat coil, general exhaust valve(s), a room pressure monitor, and room temperature sensor.
2. Each room will have a pre-determined room airflow offset setpoint. The room offset is equal to the difference to total room supply airflow and the total room exhaust airflow. The room offset will be adjustable by the BMS.
3. The supply and general exhaust valves are constant volume, will maintain a pre-set airflow setpoint as per the air valve schedule.

B. Dual Duct Supply Temperature Control

1. Room temperature control in achieved by modulation of the hot and cold deck temperature control dampers. When room temperature is above the room temperature setpoint, the cold deck damper will be fully open, and the hot deck damper will be fully closed. As the room temperature falls below the room temperature setpoint, the cold deck damper shall begin to modulate closed as the hot deck damper simultaneously modulates open. The room temperature setpoint shall be locally adjustable.

C. Single Duct Reheat Coil Temperature Control
1. Room temperature control in achieved by modulation reheat coil hot water valve.. When room temperature is above the room temperature setpoint, the hot water valve will be fully closed.. As the room temperature falls below the room temperature setpoint, the hot water valve shall modulate open. The room temperature setpoint shall be locally adjustable.

D. Room Pressure Monitor
1. The room pressure monitor will display the room pressure condition and alarm locally and at the BMS when the room pressure rises above the room negative pressure alarm setpoint. A door monitoring switch will disable the alarm when the isolation room door is open

END OF SECTION

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Rectangular ducts and fittings.
2. High pressure ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated.

1. Static-Pressure Classes:

a. Supply Ducts (Upstream from Air Terminal Units): 6-inch wg.
b. Supply Ducts (Downstream from Air Terminal Units): 1.5-inch wg.
c. Return Ducts (Negative Pressure): 1.5-inch wg.
d. Exhaust Ducts (Negative Pressure): 1.5-inch wg.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.

B. Shop Drawings: CAD-generated and drawn to 1/8 inch equals 1 foot scale are required for all high pressure ducts. Drawing shall have floor plan as background. Show fabrication and installation details for metal ducts.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

PART 2 - PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Formed-On Flanges: Ducts with transverse duct joints 28” and larger shall be constructed according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.

1. Manufacturers:

a. Ductmate Industries, Inc.
b. Lockformer.

2. The installation of flanged system shall be in accordance with the manufacturers printed instruction and installation manuals.
3. Construction of the duct, such as gauge, reinforcing, etc., shall be as indicated in the addendum to the SMACNA manuals as provided by the manufacturer and as tested by Pittsburgh Testing Laboratory.

F. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of nonbraced panel area unless ducts are lined.

2.2 HIGH PRESSURE DUCTS (UPSTREAM FROM TERMINAL UNITS)

A. This ductwork shall be defined as that between the discharge of the supply fan and pressure reducing terminal boxes. This work shall be provided and installed as shown and as specified hereinafter.

B. This ductwork shall be round in cross-section, flat oval or rectangular as shown on the drawings. It shall be constructed according to the latest edition of the ASHRAE HANDBOOK. Duct construction details shall be in accordance with the "HVAC DUCT CONSTRUCTION STANDARDS, FIRST EDITION, published by the Sheet Metal and Air Conditioning Contractors National Association Inc. except as may be abridged herein.

C. All job-constructed ducts shall be made with longitudinal joints butted and welded. Round ducts 48" in diameter and smaller and all flat oval ducts shall be factory fabricated spirally wound conduit made from zinc coated steel strips. All such ducts shall be delivered in standard lengths and shall be cut to proper length at the site by power saw to insure proper fit and square alignment.

D. Fittings used on round or flat oval ducts shall be shop fabricated by welding. Changes in direction shall be made with mitered fittings of at least 3 sections; 90 degree elbows shall contain not less than five sections. Branch takeoffs shall be at 45 degree, except where indicated on the drawings they may be 90 degree conical taps. The run of a conical take-off shall be not less than the diameter of the branch which it serves. This contractor shall furnish for review drawings of fittings which he proposes to use and shall not proceed with fabrication until review by the Architect.

E. A high degree of dimensional accuracy is required in both conduit and fittings in order that the installation may be strong, rigid, and within allowable limits of air leakage. Inside diameter of conduits when checked with ring gages shall show a variation from nominal diameter of not more than 0.030". Fittings shall be provided with male connections and, when checked with ring gages, shall show a variation from nominal outside diameter of not more than 0.015 inch.

F. Transitions shall be all welded construction. In any required rectangular ells, provide Airsan "Acoustiturn" double thick acoustical turning vanes.

G. All high pressure ducts having a dimension of 36" or greater shall be assembled using gasketed companion flanges.

H. All other joints between conduits and between conduits and fittings shall be made with "Hardcast" cement reinforced with self-tapping drill screws. Conduits shall be joined with couplings. Adjoining surfaces of fitting or coupling and conduit at each joint shall be thoroughly cleaned, and after receiving a uniform coat of cement shall be pressed together. Joints so formed shall be further strengthened by the use of hex head No. 7x12 self-tapping drill screws installed with a screw gun. Screws shall be equally spaced around the circumference and centered longitudinally on the joint. Use three screws per joint on conduit with diameters of 3" through 8" and space screws approximately 6" apart on conduit with diameters of 9" and over. Then seal the joint with "Hardcast" assembled using manufacturer's instructions.

I. It is essential that all high velocity ductwork be practically air tight. After erection in place, and before being insulated or connected to the air distribution units, each high velocity duct system shall be tested for leaks. For the test, each system shall be capped at all openings. Pressure test according to the SMACNA procedure, admitting air through a precision orifice and using pressure taps and a manometer. Under this test there shall be no whistling leaks and the pressure drop across the orifice shall not exceed the pressure drop corresponding to 1% air loss according to SMACNA Tables of the design air quantity in that branch.

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, resistant to UV light when cured, UL 723 listed, and complying with NFPA requirements for Class 1 ducts.

C. Solvent-Based Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant formulated with a minimum of 75 percent solids.

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

D. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

E. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round and flat-oval ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 15 Section "Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.
4. Outdoor, Return-Air Ducts: Seal Class C.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
7. Unconditioned Space, Exhaust Ducts: Seal Class C.
8. Unconditioned Space, Return-Air Ducts: Seal Class B.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 15 Section "Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9 painting Sections.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

    a. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test all sections. On 2nd floor project, test all sections of new and existing medium pressure ducts throughout 2nd floor from the point where duct leaves the chases to each VAV box. Repair, reseal, replace any sections of leaking duct as required to pass pressure test.

    b. On 2nd Floor also test the existing return and exhaust ducts serving this floor that are remaining. Test from connection at chase all the way to last runout as possible. Patch, reseal, and repair existing ducts as required to accommodate leakage testing and for compliance with test requirements.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before insulation application.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

3.8 DUCT CLEANING

A. Clean duct system(s) before testing, adjusting, and balancing.

3.9 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel.

B. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

C. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows." **The use of radius elbow with square inner throat is NOT acceptable for any duct velocities.**

a. Velocity 1000 fpm or Lower:

1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.

b. Velocity 1000 to 1500 fpm:

1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

c. Velocity 1500 fpm or Higher:

1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.

D. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.

END OF SECTION 233113

SECTION 233300 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manual volume dampers.
2. Fire dampers.
3. Combination fire and smoke dampers.
4. Turning vanes.
5. Duct-mounted access doors.
6. Flexible connectors.
7. Flexible ducts.
8. Duct accessory hardware.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with AMCA 500-D testing for damper rating.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90.
2. Exposed-Surface Finish: Mill phosphatized.

C. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

D. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 MANUAL VOLUME DAMPERS

A. Manufacturers:

1. Air Balance, Inc.
2. METALAIRE, Inc.
3. Nailor Industries Inc.
4. Ruskin Company.

B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.

1. Pressure Classes of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.
2. Wherever the ducts are rendered inaccessible behind non-removable ceilings or furrings, or other construction that is not easily removable to permit access to the ducts, the devices shall be equal to Young Regulator Co. No. 1200 right angle worm gear regulator with 301 concealed damper regulator. On exposed or easily accessible ducts the adjusting devices shall be equal to Young No. 1 or No. 900 and shall be fastened to the duct

C. Single-blade Volume Dampers: For dampers where neither dimension exceeds 24”, standard leakage rating, and suitable for horizontal or vertical applications.

1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 22 gage, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
2. Roll-Formed Steel Blades: 22 gage, galvanized sheet steel.
3. Blade Axles: Galvanized steel.
4. Bearings: Molded synthetic.

D. Multiple-blade Volume Dampers: For dampers where either dimension exceeds 24”, opposed-blade, standard leakage rating, and suitable for horizontal or vertical applications.

1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 16 gage, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
2. Roll-Formed Steel Blades: 16 gage, galvanized sheet steel, maximum 12” wide.
3. Blade Axles: Galvanized steel.
4. Bearings: Molded synthetic.

E. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.3 FIRE DAMPERS

A. Manufacturers:

1. Air Balance, Inc.
2. CESCO Products.
3. Greenheck.
4. Nailor Industries Inc.
5. Ruskin Company.

B. Fire dampers shall be labeled according to UL 555. Dampers up to 64 sq. ft. for vertical mount and 25 sq. ft. for horizontal mount shall be classified for dynamic closure to a minimum 2375 fpm and 4 inches w.g. static pressure for horizontal air flow, air flow up and air flow down. Velocity and pressure rating shall include both in duct and no duct installations

C. Fire Rating: 1-1/2 hours.

D. Frame: Curtain type with blades inside airstream; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.

E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.

1. Minimum Thickness: 0.052 or 0.138 inch thick as indicated and of length to suit application.
2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.

F. Mounting Orientation: Vertical or horizontal as indicated.

G. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.

H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.

I. Fusible Links: Replaceable, 165 deg F rated.

2.4 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers:

1. Air Balance, Inc.
2. CESCO Products.
3. Greenheck.
4. Nailor Industries Inc.
5. Ruskin Company.

B. General Description: Labeled according to UL 555S. Combination fire and smoke dampers shall be labeled according to UL 555 for 1-1/2-hour rating and shall be classified as Class II leakage rating for use in smoke control systems under U.L. 555S . As a part of the UL qualification, dampers shall operate at

minimum 4" w.g. in the closed position and 2000 FPM air velocity in the open position. The combination fire/smoke dampers and their actuators shall be qualified under U.L. 555S to an elevated temperature of 250 deg. F., 350 deg. F. or 450 deg. F. depending upon the actuator. Appropriate fail closed 120 volt electric actuators shall be furnished and installed by the damper manufacturer.

C. High Pressure (Class I): In ducts between the air unit discharge and the VAV boxes, furnish and install at locations shown on plans combination fire/smoke dampers equal to Ruskin Model FSD60. Frame shall be a minimum of 16 gage galvanized steel hat channel shape with tabbed corners for reinforcement. The blades shall be airfoil shaped double skin constructed of 14 gage thickness. Blade edge seals shall be silicone rubber and mechanically locked in blade edge. Seals shall withstand 450 deg. F. Jamb seals shall be stainless steel flexible metal compression type. Bearings shall be stainless steel sleeve type pressed into frame. Blade action shall be opposed blade.

D. Low Pressure (Class II): In low pressure duct and transfer openings, furnish and install at locations shown on plans combination fire/smoke dampers equal to Ruskin Model FSD36. Frame shall be a minimum of 16 gauge galvanized steel hat channel shape with tabbed corners for reinforcement. The blades shall be single skin 16 gage minimum galvanized with three longitudinal grooves for reinforcement. Jamb seals shall be stainless steel flexible metal compression type. Bearings shall be stainless steel sleeve type pressed into frame. Blade action shall be opposed blade.

E. Firestat: Firestat shall electrically and mechanically lock damper in a closed position when duct temperatures exceed 165 deg. F and still allow appropriate authority to override firestat and operate damper as may be required for smoke control functions. Firestat and position indicator switches shall be capable of interfacing electrically with building fire alarm system. Firestat shall be equipped with high limit temperature sensor that meets all requirements of NFPA92A.

F. Frame and Blades: 16 gauge, galvanized sheet steel with longitudinal grooves for reinforcement.

G. Mounting Sleeve: Factory-installed, 20 gauge, galvanized sheet steel; length to suit wall application, 16" minimum.

H. A factory enclosure shall be provided for round connections.

2.5 TURNING VANES

A. Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

B. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."

C. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

D. Provide double width acoustical turning vanes for all rectangular high pressure ductwork.

2.6 DUCT-MOUNTED ACCESS DOORS

A. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."

1. Door:

    a. Double wall, rectangular.
    b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    c. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
    d. Fabricate doors airtight and suitable for duct pressure class.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:

    a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
    b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
    c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches with outside and inside handles.
    d. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

2.7 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Ventfabrics, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd..
2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

2.8 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Thermaflex.
4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Low Pressure, Insulated, Flexible Duct: UL 181, Class 1, made and composed of a CPE liner duct permanently bonded to a coated spring steel wire helix and supporting a fiber glass insulating blanket. Low permeability outer vapor barrier of fiber glass reinforced film laminate shall complete the composite.

1. Pressure Rating: 8-inch wg positive and 1-inch negative.
2. Maximum Air Velocity: 4000 fpm.
3. R-Value: 4.2
4. Temperature Range: Minus 20 to plus 250 deg F.
5. Example: Thermaflex M-KE

C. High Pressure, Insulated, Flexible Duct (Inlet to VAV boxes): UL 181, Class 1, factory made and composed of an inner duct of woven and coated fiber glass providing an air seal and permanently bonded to coated steel wire helix, a fiber glass insulating blanket and low permeability outer vapor barrier of fiber glass reinforced metalized film laminate.

1. Pressure Rating: 16-inch (4”-10” ducts) or 8-inch (12”-16”) wg positive and 2-inch negative.
2. Maximum Air Velocity: 6000 fpm.
3. R-Value: 4.2
4. Temperature Range: Minus 20 to plus 250 deg F.
5. Example: Thermaflex M-KC

D. Flexible Duct Connectors:

1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.

2.9 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.

D. Set dampers to fully open position before testing, adjusting, and balancing.

E. Install test holes at fan inlets and outlets and elsewhere as indicated.

F. Install fire and smoke dampers according to UL listing.

G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. Downstream from manual volume dampers, control dampers,[turning vanes,] and equipment.
3. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
4. At each change in direction and at maximum 50-foot spacing.
5. Upstream of turning vanes.
6. Elsewhere as indicated.

H. Install access doors with swing against duct static pressure.

I. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.
3. Head and Hand Access: 18 by 10 inches.
4. Head and Shoulders Access: 21 by 14 inches.
5. Body Access: 25 by 14 inches.

J. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

K. Install flexible connectors to connect ducts to equipment.

L. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

M. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

SECTION 233600 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Dual-duct air terminal units.

1.3 SUBMITTALS

A. Product Data: For each type of the following products, including rated capacities, furnished specialties, sound-power ratings, and accessories.

1. Air terminal units.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

PART 2 - PRODUCTS

2.1 DUAL-DUCT AIR TERMINAL UNITS

A. Manufacturers:

1. Environmental Technologies, Inc.; Enviro-Air Div.
2. Krueger.
3. METALAIRE, Inc.; Metal Industries Inc.
4. Nailor Industries of Texas Inc.
5. Price Industries.
6. Titus.

B. Configuration: Two volume dampers inside unit casing with mixing attenuator section and control components inside a protective metal shroud.

C. Casing: 22 gauge galvanized steel.

1. Casing Lining: 1-inch thick liner equal to Titus SteriLoc.
2. Air Inlets: Round stub connections or S-slip and drive connections for duct attachment.
3. Air Outlet: S-slip and drive connections.
4. Access: Removable panels for access to parts requiring service, adjustment, or maintenance; with airtight gasket.
5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.

1. Maximum Damper Leakage: ARI 880 rated, 3 percent of nominal airflow at 3-inch wg inlet static pressure.

E. Velocity Sensors: Multipoint array with velocity sensors in cold- and hot-deck air inlets and air outlets.

F. DDC Controls: Single-package unitary controller and actuator specified and furnished in Division 15 Section "HVAC Instrumentation and Controls." **All controls and controls transformer shall be factory mounted. VAV box manufacturer shall coordinate all requirements with Johnson Controls prior to bid and continue with coordination through submittals and through delivery of product to ensure it is a smooth process.**

2.2 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Air Terminal Unit Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

C. Trapeze and Riser Supports: Steel shapes and plates for units with steel casings; aluminum for units with aluminum casings.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test assembled air terminal units according to ARI 880.

1. Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, coil type**,** and ARI certification seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

B. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

C. Install wall-mounted thermostats.

3.2 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes and for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes and for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hangers Exposed to View: Threaded rod and angle or channel supports.

D. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.3 CONNECTIONS

A. Install piping adjacent to air terminal unit to allow service and maintenance.

B. Hot-Water Piping: In addition to requirements in Division 23 Section "Hydronic Piping," connect heating coils to supply with shutoff valve, strainer, control valve, and union or flange; and to return with balancing valve and union or flange.

C. Connect ducts to air terminal units according to Division 23 Section "Metal Ducts."

D. Make connections to air terminal units with flexible connectors complying with requirements in Division 23 Section "Air Duct Accessories."

3.4 IDENTIFICATION

A. Label each air terminal unit with plan number, nominal airflow, and maximum and minimum factory-set airflows. Comply with requirements in Division 23 Section "Identification for HVAC Piping and Equipment" for equipment labels and warning signs and labels.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Air terminal unit will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.
3. Verify that controls and control enclosure are accessible.
4. Verify that control connections are complete.
5. Verify that nameplate and identification tag are visible.
6. Verify that controls respond to inputs as specified.

END OF SECTION 233600

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 GRILLES AND REGISTERS

A. Grilles and registers shall be furnished and installed as scheduled on the drawings.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Kreuger.
b. METALAIRE, Inc.
c. Nailor Industries Inc.
d. Price Industries.
e. Titus.

2.2 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 260410 - MINOR ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Existing Conditions Division 02 Specification sections, apply to the work of this section.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Verify field measurements and circuiting arrangements are as shown on Drawings.

B. Abandoned Circuits: Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Field Conditions: Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner and Architect/Engineer before disturbing existing installation.

D. Existing Conditions: Beginning of demolition means installer accepts existing conditions.

3.2 REPARATION

A. Demolition: Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Utility Coordination: Coordinate utility service outages with Utility Company.

C. Temporary Wiring: Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

F. Existing Telephone System: Maintain existing system in service new system is accepted. Disable system only to make switchovers and connections. Notify Owner and Telephone Utility Company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. General: Demolish and extend existing electrical work under provisions of the Drawings, General Provisions of the Contract, including General and Supplementary Conditions and Existing Conditions Division 02 Specification sections.

B. New Construction: Remove, relocate, and extend existing installations to accommodate new construction.

C. Abandoned Wiring: Remove abandoned wiring to source of supply.

D. Exposed Conduit: Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Abandoned Devices: Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets, which are not removed.

F. Abandoned Panelboards: Disconnect and remove abandoned panelboards and distribution equipment.

G. Abandoned Equipment: Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

H. Abandoned Lighting Fixtures: Disconnect and remove abandoned lighting fixtures. Remove brackets, stems, hangers, and other accessories.

I. Adjacent Construction: Repair adjacent construction and finishes damaged during demolition and extension work.

J. Existing wiring to remain active: Maintain access to existing electrical installations, which remain active. Modify installation or provide access panel as appropriate.

K. Extension of existing wiring: Extend existing installations using materials and methods compatible with existing electrical installations, as specified.

3.4 CLEANING AND REPAIR

A. Existing Materials: Clean and repair existing materials and equipment that remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

C. Lighting Fixtures: Remove existing lighting fixtures for cleaning. Use mild detergent to clean all exterior and interior surfaces, rinse with clean water and wipe dry. Replace lamps and broken electrical parts.

D. Ballasts: Replace the ballasts in all existing lighting fixtures with new ballasts as specified under Section 290923 - LIGHTING.

3.5 INSTALLATION

A. Relocated Materials: Install relocated materials and equipment under the provisions of Division 1 of the Specifications.

END OF SECTION 16060

SECTION 260510 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. General requirements.
2. Electrical equipment coordination and installation.
3. Sleeves for raceways and cables.
4. Sleeve seals.
5. Grout.
6. Common electrical installation requirements.

1.3 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. Connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

1.4 GENERAL REQUIREMENTS

A. In general, the electrical lines to be installed under these Specifications shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards as to complete the work in a neat and satisfactorily workable manner. The following is a general outline concerning the running of electrical lines and is to be excepted where the drawings or conditions at the building necessitate deviating from these standards.

B. The Contractor shall thoroughly acquaint himself with the details of the construction and finishes before submitting his bid as no allowances will be made because of the Contractor's unfamiliarity with these details. Place all inserts in masonry walls while they are under construction. All concealed lines shall be installed as required by the pace of the general construction to precede that general construction.

C. The electrical Drawings do not give exact details as to elevations of electrical lines, exact locations, etc., and do not show all the offsets, and other installation details. The Contractor shall carefully lay out his work at the site to conform to the architectural and structural conditions, to avoid all obstruction, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactorily operating installation.

D. The electrical Drawings show diagrammatically the locations of the various electrical outlets and apparatus and the method of circuiting and controlling them. Exact locations of these outlets and apparatus shall be determined by reference to the general Drawings and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building, and in cooperation with other sections, and in all cases shall be subject to the approval of the Architect. The Architect reserves the right to make any reasonable change in location of any outlet or apparatus before installation (within 10 feet of location shown on drawings) or after installation if an obvious conflict exists, without additional cost to the Owner.

E. The Contractor shall be responsible for the proper fitting of his material and apparatus into the space. Should the particular equipment that any bidder proposes to install require other space conditions than those indicated on the drawings, he shall arrange for such space with the Architect before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

F. The contractor for the work under each section of these specifications shall coordinate his work with the work described in all other sections of the specifications to the end that, as a whole, the job shall be a finished one of its kind, and shall carry on his work in such a manner that none of the work under any section of these specifications shall be handicapped, hindered or delayed at any time.

G. At all times during the progress of the work, the Contractor shall keep the premises clean and free of unnecessary materials and debris. The Contractor shall, on direction at any time from the Architect, clear any designated areas or area of materials and debris. On completion of any portion of the work, the Contractor shall remove from the premises all tools and machinery and all debris occasioned by the work, leaving the premises free of all obstructions and hindrances.

H. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans. The drawings shall be checked by the Architect before the work is started. Any conflict with the building conditions shall be corrected by the Contractor before the work proceeds.

I. Order of precedence shall be observed in laying out the pipe, ductwork, material, and conduit in order to fit the material into the space above the ceiling and in the chases and walls. The following order shall govern:

1. Items affecting the visual appearance of the inside of the building such as lighting fixtures, diffusers, grilles, outlets, panelboards, etc. Coordinate all items to avoid conflicts at the site.
2. Lines requiring grade to function such as sewers, roof drains and condensate drains.
3. Large ducts and pipes with critical clearances.
4. Conduit, water lines, and other lines whose routing is not critical and whose function would not be impaired by bends and offsets.

J. Conduits serving outlets on items of equipment shall be run in the most appropriate manner. Where the equipment has built-in chases, the lines shall be contained therein. Where the equipment is of the open

type, the lines shall be run as close as possible to the underside of the top and in a neat and inconspicuous manner.

K. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through windows, doorways or shafts, shall be brought to the job by the Contractor involved and placed in the space before the enclosing structure is completed.

L. Exceptions and inconsistencies in Drawings and Specifications shall be brought to the Architect's attention before the contract is signed. Otherwise, the Contractor shall be responsible for any and all changes and additions that may be necessary to accommodate his particular apparatus, material, or equipment.

M. The Contractor shall distinctly understand that the work described herein and shown on the accompanying drawings shall result in a finished and working job, and any item required to accomplish this intent shall be included whether specifically mentioned or not.

N. Each bidder shall examine the Drawings and Specifications for the General Construction. If these documents show any item requiring work under Division 26 and that work is not indicated on the respective Electrical drawings, he shall notify the Architect in sufficient time to clarify before bidding. If no notification is received, the Contractor is assumed to require no clarification, and shall install the work as indicated on the General Drawings in accordance with the Specifications.

O. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be submitted to the Architect for consideration before proceeding with the work.

P. The accompanying plans do not indicate completely the existing electrical installations. The bidders for the work under these sections of the specifications shall inspect the existing installations and thoroughly acquaint themselves with conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work in the present building and underground serving to and from that structure. Failure to comply with this shall not constitute grounds for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work.

Q. There are portions of the existing electrical System that shall remain in use to serve the finished building in conjunction with the indicated new installations. By actual examination at the site, each bidder shall determine those portions of the remaining present installations, which must be relocated to avoid interference with the installations of new work of his particular trade and that of all other trades. All such existing installations that interfere with new installations shall be relocated by the Contractor under the Division in which the existing material normally belongs, and in a manner as directed by the Architect. For example where existing conduit and electrical equipment interferes with the installation of new work; it shall be relocated under Division 16. Failure to become familiar with the extent of the relocation work involved shall not relieve the Contractor of responsibility and shall not be used as a basis for additional compensation.

R. All electric wiring of every character, both for power supply, for pilot and control, for temperature control, for communications, etc. will be done under Division 16 of these Specifications. Every electrical current consuming device furnished as a part of this project, or furnished by the Owner and installed in this project, shall be completely wired up under Division 26. Verification of exact location, method of connection, number and size of wires required, voltage requirements, and phase requirements is the responsibility of the Contractor under Division 26. If conflicts occur between the drawings and the actual requirements, actual requirements shall govern.

S. All manufactured articles shall be applied, installed and handled as recommended by the manufacturer.

T. The workmanship shall in all respects be of the highest grade and all construction shall be done according to the best practice of the trade.

U. The shop drawings for all equipment are hereby made a part of these Specifications. The Contractor under each section of the Specifications shall rough-in for the exact item to be furnished on the job, whether in another section of the Specifications or by the Owner. The Contractor shall refer to all drawings and other sections of the Specifications for the scope of work involved for the new equipment, and by actual site examination determine the scope of the required equipment connections for the Owner furnished equipment.

V. Should any of the equipment furnished require connections of a nature different from that shown on the drawings, report the matter to the Architect and finally connect as directed by the Architect. Minor differences in the equipment furnished and that indicated on the drawings will not constitute ground for additional payment to the Contractor.

1.5 MATERIALS

A. All materials shall be new unless otherwise specified and of the quality specified. Materials shall be free from defects and undamaged. All materials of a type for which the Underwriters Laboratories, Inc. have established a standard shall be listed by the Underwriters Laboratories, Inc. and shall bear their label.

B. The Architect reserves the right to call for samples of any item of material offered in substitution, together with a sample of the specified material, when, in the Architect's opinion, the quality of the material and/or the appearance is involved and it is deemed that an evaluation of the two materials may be better made by visual inspection. This shall be limited to lighting fixtures, wiring devices, and similar items and shall not be applicable to major manufacturers' items of equipment.

C. The Contractor shall be responsible for transportation of his materials to and on the job, and shall be responsible for the storage and protection of these materials and work until the final acceptance of the job.

D. The Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of his contract.

1.6 SUBMITTALS

A. Wherever shop drawings/submittals are called for in these specifications, they shall be furnished by the Contractor for the work involved after review by the Architect as to the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary details. Also, if the Contractor fails to comply with this provision, the Architect reserves the right to go directly to the manufacturer he selects and secure any details he might deem necessary and should there be any charges in connection with this, they shall be borne by the Contractor.

B. Shop drawings will be reviewed by the Architect for general compliance with the design concept of the project and general compliance with the information given in the contract documents. Review by the Architect and any action by the Architect in marking shop drawings is subject to the requirements of the entire contract documents. Contractor will be held responsible for quantities, dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of construction, coordination of all trades and the satisfactory performance of his work.

C. Shop drawings submitted shall not consist of manufacturers' catalogues or tear sheets therefrom that contain no indication of the exact item offered. Rather, the submission of individual items shall designate the exact item offered and shall clearly identify the item with the project.

D. All shop drawings shall be submitted at one time and shall consist of a bound catalogue of all shop drawings under each section, properly indexed and certified that they have been checked by the Contractor.

E. The omissions of any material from the shop drawings which has been shown on the contract drawings or specified, even though reviewed by the Architect, shall not relieve the Contractor from furnishing and erecting same.

1.7 PERMITS, FEES, ETC.

A. The Contractor under each section of these specifications shall arrange for a permit from the local authority. The Contractor shall arrange for all utility services, including sewer, water and gas services as applicable. If any charges are made by any of the utility companies due to the work on this project, the Contractor shall pay these charges, including charges for metering, connection, street cutting, etc. The Contractor shall pay for any inspection fees or other fees and charges required by ordinance, law, codes and these specifications.

1.8 LAWS, CODES, AND ORDINANCES

A. All work shall be executed in strict accordance with all local, state and national codes, ordinances and regulations governing the particular class of work involved, as interpreted by the inspecting authority. The Contractor shall be responsible for the final execution of the work under this heading to suit those requirements. Where these specifications and the accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect, shall prepare any supplemental drawings required illustrating how the work may be installed so as to comply and, on approval, make the changes at no cost to the Owner. On completion of the various portions of the work the installation shall be tested by the constituted authorities, approved and, on completion of the work, the Contractor shall obtain and deliver to the Owner a final certificate of acceptance.

1.9 TESTING

A. The Contractor under each division shall at his own expense perform the various tests as specified and required by the Architect and as required by the State and local authorities. The Contractor shall furnish all fuel and materials necessary for making tests. Notify the Architect a minimum of 24 hours in advance of all tests.

1.10 COORDINATION OF TRADES

A. The Contractor shall be responsible for resolving all coordination required between trades. For example, items furnished under Division 23 which require electrical connections shall be coordinated with Division 26 for:
1. Voltage
2. Phase
3. Ampacity
4. No. and size of wires
5. Wiring diagrams
6. Starter size, details and location

7. Control devices and details

B. Items furnished under various sections which require electrical connections shall be coordinated for services, voltage, size and location of connections.

C. Items requiring insulation shall be fully insulated and that insulation shall be checked against manufacturer's directions and job requirements for suitability, coverage, thickness and finish.

D. Items installed in/on finished ceilings shall be coordinated with the ceiling construction. The Contractor under each section shall conform to the reflected ceiling plan and shall secure details and/or samples of the ceiling materials as necessary to insure compatibility. Any device not conforming to this requirement shall be replaced by the Contractor at his expense.

E. All items specified under Division 26 shall be installed tight, plumb, level, square and symmetrically placed in relation to the work of other trades.

1.11 CUTTING AND PATCHING

A. All cutting and patching for work under Division 23 shall be done by the Contractor under the section for which the trade is specified.

1.12 CUTTING AND PATCHING

A. The Contractor for work specified under each section shall perform all structural and general construction modifications and cut all openings through either roof, walls, floors or ceilings required to install all work specified under that section or to repair any defects that appear up to the expiration of the guarantee. The Contractor shall exercise due diligence to avoid cutting openings larger than required or in wrong locations. Verify the scope of this work at the site and in cooperation with all other trades before bidding.

B. No cutting shall be done to any of the structural members that would tend to lessen their strength, unless specific permission is granted by the Architect to do such cutting.

C. The Contractor for work under each section shall be responsible for the patching of all openings cut to install the work covered by that section and to repair the damage resulting from the failure of any part of the work installed hereunder.

D. Before bidding, the Contractor shall review and coordinate the cutting and patching required under the respective section with all trades.

E. In all spaces where new work under Division 23 is installed and no other alteration or refinishing work is shown or called for, existing floors, walls and ceilings shall be restored to match existing conditions. All cutting and patching shall be done by workmen skilled in the affected trade.

F. Where openings are cut through masonry walls, the Contractor under each respective section shall provide and install lintels or other structural supports to protect the remaining masonry and adequate support shall be provided during the cutting operation to prevent any damage to the masonry occasioned by the operation.

1.13 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.14 SUBSTITUTIONS

A. Where a definite material or only one manufacturer's name is mentioned in these specifications, it has been done in order to establish a standard. The product of the particular manufacturer mentioned is of satisfactory construction and any substitution must be of quality as good as or better than the named article. No substitution shall be made without review by the Architect, who will be the sole judge of equality.

B. The Contractor shall submit for approval a complete list of the materials he proposes to use. This list shall give manufacturers' names and designations corresponding to each and every item and the submission shall be accompanied by complete descriptive literature and/or any supplementary data, drawings, etc., necessary to give full and complete details.

C. Should a substitution be accepted under the provisions of the conditions of these specifications, and should this substitute prove to be defective or otherwise unsatisfactory for the service for which it is intended within the guarantee period, the Contractor who originally requested the substitution shall replace the substitute material with the specified material.

1.15 TEMPORARY POWER AND LIGHTING

A. Engage the appropriate local utility company to install temporary service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

B. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.

C. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

D. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

E. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect. Neither the Owner nor Architect will accept cost or use charges as a basis of claims for Change Orders.

F. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear. All temporary power for construction will be provided by Contractor. Owner will pay bills when submitted for payment.

G. Install electric power service underground, except where overhead service must be used.

H. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, power wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance. All circuits must be ground-fault circuit interrupter protected.

I. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment. Provide four gang outlets, spaced so 100 foot cords can reach any areas. Provide separate 120 VAC, 20 amp GFCI circuit for each four gang outlet.

J. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

K. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching:

1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

L. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

M. Provide three 100-W incandescent lamps per 500 sq. ft. (45 sq. m), uniformly distributed, for general lighting, or equivalent illumination.

N. Provide two 100-W incandescent lamps every 50 feet (15 m) in traffic areas.

O. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the work is being performed.

1.16 USE OF SYSTEMS

A. It is considered that it will be necessary to operate the mechanical systems to provide heating and ventilation in portions of the building that are enclosed. As systems or portions of systems become operable, they shall be operated as required to maintain habitable conditions in enclosed portions of the building that are still under construction and portions that are fully complete as may be required to properly protect installed piping, equipment and finishes.

B. In order to provide protection to ducts, plenums, etc. install temporary filters over or in return air openings until all finished painting is completed. Protect supply outlets, coils, etc. as necessary in each case.

C. Except for operation of cooling equipment to prove its performance and to adjust and balance the systems, that equipment will not be operated for comfort of construction workers.

D. During warm weather the Contractor shall arrange for the operation of systems to supply 100 percent outside air. The systems controls shall be reset to their normal cycle of operation in each case during the times that heating is required and when the cooling equipment is operated.

E. Immediately prior to the time that the systems are to be accepted by the Owner, each system shall be carefully examined and if ductwork is dirty, it shall be carefully cleaned by men skilled in that type of work. All filters shall be put in first class condition by replacement of filters and/or other procedures as directed.

F. The use of the equipment for maintaining environmental and/or protective temperature conditions shall in no way constitute acceptance of that equipment and the connected piping, ducts, insulation, finishes, etc. by the Owner. Furthermore, it shall in no way shorten the guarantee period hereinafter specified. The Contractor shall either secure extended warranties from the vendors of equipment or shall purchase insurance to provide proper coverage on the equipment through the guarantee period and shall file with the Architect substantiating affidavits from equipment manufacturers or a copy of the insurance policy covering the equipment through the guarantee period. The personal underwriting of the Contractor for equipment manufacturers' warranties is not acceptable, but his personal underwriting of piping, ductwork, insulation and associated materials is acceptable subject to the provisions of the contract.

G. The Contractor shall provide such labor as may be required in the operation of the systems and shall pay all costs.

1.17 INSTALLATION DRAWINGS

A. It shall be incumbent upon the Contractor to prepare special drawings as called for elsewhere herein or as directed by the Architect to coordinate the work under each section, to illustrate changes in his work, to facilitate its concealment in finished spaces to avoid obstructions or to illustrate the adaptability of any item of equipment which he proposes to use.

B. These drawings shall be used in the field for the actual installation of the work. Unless otherwise directed, they shall not be submitted for approval but three copies shall be provided to the Architect for his information.

1.18 OPERATING INSTRUCTIONS

A. The Contractor for each section of the work hereunder shall, in cooperation with the representatives of the manufacturers of the various equipment items, carefully instruct the Owner's representatives in the proper operation of each item of equipment and of each system. During the balancing and adjusting of systems, the Owner's representative shall be made familiar with all procedures.

1.19 OPERATING MANUALS

A. Prepare and submit 3 copies of the operating manuals bound in hard covers. Three weeks prior to completion of the work, the Architect will check the manuals and any additional material necessary to complete the manuals shall be furnished and inserted by the Contractor.

B. Manuals shall contain the following data:

1. Catalogue data of all equipment.
2. Shop drawings of all equipment.
3. Panel schedules.
4. Start-up instructions for major equipment.

5. Trouble shooting procedures for major equipment.
6. Wiring diagrams.
7. Recommended maintenance schedule for equipment.
8. Parts list for all items.
9. Name and address of each vendor.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 7 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 LOCATION AND DETECTION

A. Below ground:

1. Non-Metallic: Non-metallic pipe installed below ground shall have installed in the same trench a detectable plastic tape that conforms in to the APWA color coding as follows:
   a. Orange – Telecommunications
   b. Blue – Water
   c. Green – Sanitary and Sewer Systems
   d. Yellow – Gas
2. Such tape shall consist of one layer of aluminum foil laminated between two layers of inert plastic film. Tape shall be approved 2 1/8" wide and shall be imprinted with a continuous traceable for a minimum of eight years after direct burial. Product shall be Terra Tape Detectable or approved equal. Tape shall be installed per manufacturer's instructions, but no less than 12" above the buried line.
3. Provide 16 gauge direct burial tracer wire with all non-metallic underground pipe. Wire shall be single strand, 14 gauge minimum with 4/64" vinyl insulation which is UL approved for direct underground burial when used in a National Electric Code Class II circuit.

B. Metallic:
1. Below ground metallic piping shall have identifying tape similar to that specified for below ground non-metallic except that the aluminum foil for location is not required.

3.4 PAINTING

A. If the factory finish on any apparatus or equipment is marred, it shall be touched up and then given one coat of half-flat-half-enamel, followed by a coat of machinery enamel of a color to match the original. Paint factory primed surfaces.

B. Paint all exposed conduit, boxes, cabinets, hangers and supports, and miscellaneous metal.

C. Generally, painting is required on all surfaces such that no exposed bare metal is visible.

3.5 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

END OF SECTION 260510

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire for light fixtures only.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

E. Feeders Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.

F. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

I. Branch Circuits Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.

J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

K. Class 1 Control Circuits: Type THHN-THWN, in raceway.

L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

M. All fire alarm wiring shall be in raceway, minimum size ¾". Voice/Data, thermostat, lighting control wiring: Extend conduit to an accessible point above ceiling. In areas with exposed ceilings/structure route low-voltage/control wiring in conduit.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Grounding systems and equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Ground rods.
2. Grounding arrangements and connections for separately derived systems.
3. Grounding for sensitive electronic equipment.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, ¼" by 4" inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 feet in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down to specified height above floor; connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.

3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

F. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.

1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a ¼” – by – 4” – by -12”-inch grounding bus.
3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 LABELING

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.

1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. Thomas & Betts Corporation.
e. Unistrut; Tyco International, Ltd.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.
8. Roof Mounted conduit use MAPA products conduit support systems.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
9. Roof Mounted conduit use MAPA products conduit support systems.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. LFMC: Liquid-tight flexible metal conduit.

C. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Allied Tube & Conduit; a Tyco International Ltd. Co.
2. Electri-Flex Co.
3. Wheatland Tube Company.

C. Rigid Steel Conduit: ANSI C80.1.

D. EMT: ANSI C80.3.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: compression type.

G. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CANTEX Inc.
2. Electri-Flex Co.
3. Carlon Electrical Products.
4. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.3 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. Hoffman.
3. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
4. RACO; a Hubbell Company.
5. Thomas & Betts Corporation.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

D. Multi-gang boxes are not acceptable in hospital and ASC facilities in patient care areas.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

H. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.5 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.6 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Plastic. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: Rigid steel conduit.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC (Sealtite).
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
6. Application of Handholes and Boxes for Underground Wiring:

a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer-concrete units, SCTE 77, Tier 8 structural load rating.
c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

a. Loading dock.
b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
c. Mechanical rooms.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: Rigid steel conduit.
7. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
8. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
9. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: General-use, optical fiber/communications cable raceway.
10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from Type EPC-40-PVC, or rigid steel conduit before rising above the floor.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

P. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit conduit (minumum 36" deep). Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.5 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.7 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

C. Colors for Raceways Carrying Circuits at More Than 600 V:

1. Black letters on an orange field.
2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch-high letters on 20-inch centers.

D. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.4 FLOOR MARKING TAPE

A. 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.5 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.6 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 ELECTRICAL EQUIPMENT AND DEVICES IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

B. All panels, disconnects, light switches, and receptacles shall be labeled in accordance with TDH. Label must indicate name of device and branch circuit feeding the electrical device or equipment as required by TDH and NFPA. Coordinate requirements with UMC and TTUHSC personnel.

2.8 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

H. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl tape applied in bands. Install labels at 10-foot maximum intervals.

B. Accessible Raceways and Cables of Auxiliary Systems: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl tape applied bands:

1. Fire Alarm systems: Red.
2. Security System: Blue and yellow.
3. Telecommunications System: Green and yellow.
4. Control wiring: Green and red.

C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 10 AWG, if authorities having jurisdiction permit.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

E. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.
b. Controls with external control power connections.

J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.

L. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.

c. Access doors and panels for concealed electrical items.
d. Switchgear.
e. Switchboards.
f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
g. Substations.
h. Emergency system boxes and enclosures.
i. Motor-control centers.
j. Enclosed switches.
k. Enclosed circuit breakers.
l. Enclosed controllers.
m. Variable-speed controllers.
n. Push-button stations.
o. Power transfer equipment.
p. Contactors.
q. Remote-controlled switches, dimmer modules, and control devices.
r. Battery-inverter units.
s. Battery racks.
t. Power-generating units.
u. Monitoring and control equipment.
v. UPS equipment.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Photoelectric switches.
2. Standalone daylight-harvesting switching controls.
3. Indoor occupancy sensors.
4. Lighting contactors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.
2. Include diagrams for power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 OUTDOOR PHOTOELECTRIC SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Intermatic Inc.
2. Novitas, Inc
3. Square D; Schneider Electric.
4. Watt Stopper (The).

B. Description: Solid state, with SPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off.
3. Time Delay: Fifteen second minimum, to prevent false operation.
4. Surge Protection: Metal-oxide varistor, comply with IEEE C62.41.1, IEEE C62.41.2, and IEEE 62.45 for Category A1 locations.

5. Mounting: Twist lock complies with NEMA C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

2.2 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Lutron Electronics Co., Inc. or approved equal

B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
3. Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.

C. Wall-Switch Sensor:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 2100 sq. ft.
2. Sensing Technology: Dual technology - PIR and ultrasonic.
3. Switch Type: SP
4. Voltage: 120 or 277 V type.
5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

2.3 LIGHTING CONTACTORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Square D; a brand of Schneider Electric.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution; Total Lighting Control.
3. Eaton Corporation.

B. Description: Electrically operated and electrically held, combination-type lighting contactors complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.

2.4 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.

2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Lighting control devices will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems specified in Division 26 Section "Network Lighting Controls."

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 260923

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Snap switches and wall-box dimmers.
3. Pendant cord-connector devices.
4. Cord and plug sets.
5. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
2. Leviton Mfg. Company Inc. (Leviton).
3. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

B. Device body and coverplate colors shall match existing. Coordinate color requirements with architect and owner.

2.2 STRAIGHT BLADE RECEPTACLES

A. Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498 Supplement SD. **All receptacles shall be hospital grade and tamper resistant.**

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; 8200TR
Or Approved Equal

2.3 USB RECEPTACLES

A. General Description: Straight blade, non-feed-through type with two(2) Type 2.0 USB ports. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped. **All receptacles shall be hospital grade and tamper resistant.**

B. Duplex GFCI Convenience Receptacles with two(2) Type 2.0 USB ports, 125 V, 20 A: Comply with UL 498 Supplement SD.
2. Products: Subject to compliance with requirements, provide one of the following:
a. Hubbell; USB8200.
b. Or Approved Equal

2.4 TAMPER RESISTANT RECEPTACLES

A. Duplex Convenience Receptacles, 125 V, 20 A with tamper resistant internal mechanisms to limit access to energized internal components. **All receptacles shall be hospital grade.**

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; 8200TR
b. Or Approved Equal

2.5 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped. **All receptacles shall be hospital grade and tamper resistant.**

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A: Comply with UL 498 Supplement SD.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; GFTWRST82SNAP20LA.
b. Or Approved Equal

2.6 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.7 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A: **All switches shall be hospital grade.**

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
b. Or approved equal.

C. Pilot Light Switches, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; HPL1221PL for 120 V and 277 V.
a. Or approved equal.

2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

D. Key-Operated Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Hubbell; HBL1221L.
    a. Or approved equal.

2. Description: Single pole, with factory-supplied key in lieu of switch handle.

E. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Hubbell; HBL1557.
    b. Or approved equal.

F. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

Products: Subject to compliance with requirements, provide one of the following:

    a. Hubbell; HBL1557L.
    b. Or approved equal.

2.8 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Coordinate device plates with architect and owner.
2. Coordinate faceplate and circuit labeling with owner and architect as required by TDH
3. Plate-Securing Screws: Metal with head color to match plate finish.
4. Material for Finished Spaces: coordinate with architect and owner.
5. Material for Unfinished Spaces: 0.035-inch-thick, satin-finished stainless steel.
6. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

2.9 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.
1. Coordinate colors plates with architect and owner.
2. Wiring Devices Connected to Normal Power System: coordinate with architect and owner. unless otherwise indicated or required by NFPA 70 or device listing.
3. Wiring Devices Connected to Emergency Power System: Red.

2.10 3.0 FLOOR BOX SERVICE FITTINGS

A. Type: Fire rated poke -through floor box, flush-type, dual-service units suitable for wiring method used.

B. Compartments: Barrier separates 120v power from voice and data communication cabling.

C. Coordinate Cover Plate Color with architect and owner.

D. Power Receptacle: NEMA WD 6 configuration 5-20R, unless otherwise indicated.

E. Voice and Data Communication Outlet: Two modular, keyed, color-coded, RJ-45 Category 6 jacks for UTP cable. Extend two(2) 1" conduits from box to an accessible point above ceiling.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell System One Series; Or Approved Equal

PART 5 - EXECUTION

5.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

a. Cut back and pigtail, or replace all damaged conductors.
b. Straighten conductors that remain and remove corrosion and foreign matter.
c. Pig-tailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. **All receptacles and switches shall be hospital grade.**

2. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
3. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
4. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
5. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
6. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
7. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
8. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
9. Tighten unused terminal screws on the device.
10. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

5.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. All receptacles and switches shall have labels on cover plates in accordance with NFPA and TDH.

2. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

5.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
2. Test Instruments: Use instruments that comply with UL 1436.
3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.

3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 262726

SECTION 262913 - ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following enclosed controllers rated 600 V and less:

1. Full-voltage manual.
2. Full-voltage magnetic.

1.3 DEFINITIONS

A. CPT: Control power transformer.

B. MCCB: Molded-case circuit breaker.

C. MCP: Motor circuit protector.

D. N.C.: Normally closed.

E. N.O.: Normally open.

F. OCPD: Overcurrent protective device.

G. SCR: Silicon-controlled rectifier.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed controller. Include manufacturer's technical data on features, performance, electrical characteristics, ratings, and enclosure types and finishes.

B. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.

1. Show tabulations of the following:

a. Each installed unit's type and details.
b. Factory-installed devices.
c. Nameplate legends.
d. Short-circuit current rating of integrated unit.
e. Listed and labeled for integrated short-circuit current (withstand) rating of OCPDs in combination controllers by an NRTL acceptable to authorities having jurisdiction.

f. Features, characteristics, ratings, and factory settings of individual OCPDs in combination controllers.

2. Wiring Diagrams: For power, signal, and control wiring.

C. Field quality-control reports.

D. Operation and Maintenance Data: For enclosed controllers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Routine maintenance requirements for enclosed controllers and installed components.
2. Manufacturer's written instructions for testing and adjusting circuit breaker and MCP trip settings.
3. Manufacturer's written instructions for setting field-adjustable overload relays.
4. Manufacturer's written instructions for testing, adjusting, and reprogramming reduced-voltage solid-state controllers.

E. Load-Current and Overload-Relay Heater List: Compile after motors have been installed, and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.

F. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed, and arrange to demonstrate that switch settings for motor running overload protection suit actual motors to be protected.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

D. IEEE Compliance: Fabricate and test enclosed controllers according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store enclosed controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.

B. If stored in areas subject to weather, cover enclosed controllers to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

B. Interruption of Existing Electrical Systems: Do not interrupt electrical systems in facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven days in advance of proposed interruption of electrical systems.
2. Indicate method of providing temporary utilities.
3. Do not proceed with interruption of electrical systems without Architect's and Owner's written permission.
4. Comply with NFPA 70E.

1.8 COORDINATION

A. Coordinate layout and installation of enclosed controllers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

C. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 FULL-VOLTAGE CONTROLLERS

A. General Requirements for Full-Voltage Controllers: Comply with NEMA ICS 2, general purpose, Class A.

B. Motor-Starting Switches: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.

1. Manufacturers:
   a. Square D; a brand of Schneider Electric.
   b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
   c. Rockwell Automation, Inc.; Allen-Bradley brand.
   d. Cutler-Hammer

C. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.

1. Overload Relays: NEMA ICS 2, melting alloy type.
2. Mounting: Surface

2.3 Magnetic Controllers: Full voltage, across the line, electrically held.

1. Configuration**:** Non-reversing.

2. Contactor Coils: Pressure-encapsulated type with coil transient suppressors.

    a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.

3. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
4. Control Circuits: Coordinate control voltage with system.

5. Solid-State Overload Relay:

    a. Switch or dial selectable for motor running overload protection.
    b. Sensors in each phase.
    c. Selectable tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
    d. Analog communication module.
    e. Electronic type; with phase loss and unbalance protection.
    f. External overload reset push button.

D. Combination Magnetic Controller: Factory-assembled combination of magnetic controller, OCPD, and disconnecting means.

1. Fusible Disconnecting Means:

    a. NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class R fuses.
    b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces to receive enclosed controllers, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine enclosed controllers before installation. Reject enclosed controllers that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Division 26 Section "Hangers and Supports for Electrical Systems."

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in each fusible-switch enclosed controller.

D. Install fuses in control circuits if not factory installed. Comply with requirements in Division 26 Section "Fuses."

E. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.

F. Install, connect, and fuse thermal-protector monitoring relays furnished with motor-driven equipment.

G. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved nameplate.
3. Label each enclosure-mounted control and pilot device.

3.4 CONTROL WIRING INSTALLATION

A. Install wiring between enclosed controllers and remote devices and facility's central control system. Comply with requirements in Division 26 Section "Control-Voltage Electrical Power Cables."

B. Bundle, train, and support wiring in enclosures.

C. Connect selector switches and other automatic-control selection devices where applicable.

1. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.
2. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.5 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test continuity of each circuit.

B. Tests and Inspections:

1. Inspect controllers, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment.
2. Test continuity of each circuit.
3. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages.
4. Test each motor for proper phase rotation.
5. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

6. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Enclosed controllers will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports including a certified report that identifies enclosed controllers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

A. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload-relay pickup and trip ranges.

B. Adjust overload-relay heaters or settings if power factor correction capacitors are connected to the load side of the overload relays.

C. Adjust the trip settings of MCPs and thermal-magnetic circuit breakers with adjustable instantaneous trip elements. Initially adjust to six times the motor nameplate full-load ampere ratings and attempt to start motors several times, allowing for motor cooldown between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed eight times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required

END OF SECTION 262913

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and drivers.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color-rendering index.

C. LER: Luminaire efficacy rating.

D. Lumen: Measured output of lamp and luminaire, or both.

E. Luminaire: Complete lighting fixture, including driver housing if provided.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Energy-efficiency data.
4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
5. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type.

    a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
    b. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Shop Drawings: For nonstandard or custom lighting fixtures. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910, complying with the IESNA Lighting Measurements Testing & Calculation Guides.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NFPA 70.

E. FM Global Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

F. Mockups: Provide interior lighting fixtures for room or module mockups, complete with power and control connections.

1. Obtain Architect's approval of fixtures for mockups before starting installations.
2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
3. Approved fixtures in mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty : Manufacturer's standard form in which light fixtures manufacturer agrees to repair or replace light fixtures that fail in materials or workmanship within specified warranty period.

B. Warranty Period for LED Light Fixtures: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

2.2 LED LIGHT FIXTURES

A. Recessed Fixtures: Comply with NEMA LE 4.

B. Bulb shape complying with ANSI C79.1.

C. Lamp base complying with ANSI C81.61 or IEC 60061-1.

D. CRI of minimum 65. CCT of 4000 K.

E. Rated lamp life of 35,000 hours.

F. Lamps dimmable from 100 percent to 0 percent of maximum light output.

G. Internal driver.

H. Nominal Operating Voltage: Universal.

1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

2.3 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.

F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures:

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.

1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches from lighting fixture corners.
2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
4. Install at least two independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

D. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Verify that self-luminous exit signs are installed according to their listing and the requirements in NFPA 101.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100

SECTION 271500 – TELEPHONE, DATA AND TV COMMUNICATIONS CABLING

PART 1 - GENERAL

RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions (if any) and Division 1 - General Requirements apply to Work of this Section.

REFERENCES

B. Design, installation and testing of all passive components shall be in compliance with the following referenced documents using latest edition, including any errata or additions:

C. TIA-568-2.1,.2,.3,.4, Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted Pair Cable Components.

D. TIA-568-C.1, Commercial Building Telecommunications Cabling Standard.

E. TIA-569-D, Telecommunications Pathways and Spaces.

SYSTEM DESCRIPTION AND DEFINITIONS

A. The communication system shall include Category 6 patch panel, Category 6 telephone data, and television(TV) outlets, and connecting hardware. Connecting hardware shall be rated for operation under ambient conditions of 32 to 140 degrees F.

B. All work under this section shall be performed by and all equipment shall be furnished and installed by a qualified telecommunications contractor hereafter referred to as Contractor. Contract shall have minimum of 3 years experience in the application, installation and testing of the specified systems and equipment.

C. The equipment and hardware provided under this contract will be from manufacturers that have a minimum of 3 years experience in producing the types of systems and equipment specified.

D. Cable Requirements and Definitions

E. Horizontal Distribution Wiring - Category 6 UTP/U. All cabling shall be installed by Commscope Systimax certified contractor. Coordinate requirements with hospital IT personnel.

F. Intra-building cable that cross-connects the workstation data jack to the designated equipment closet. Horizontal wiring shall be four pair, grade Unshielded Twisted Pair (UTP) cable meeting, at a minimum, Category 6 standards(match existing). Panduit RJ-45 modular connectors will be wired to meet EIA/TIA-568B standards and color code tables. Each connection shall include all eight wires of the four pair cable. All termination patch panels will comply with category 6 standards. Additionally, all equipment selected will meet the manufacturer's end-to-end solution requirements for warranty. All horizontal wiring shall be secured and/or protected to safeguard against damage. All cables that drop below ceiling level will be concealed conduit. Contractor shall coordinate exact connection requirements with hospital IT personnel prior to any installation.

G. Patch Panels: Panduit RJ-45 patch panels shall support all of the RJ-45 connections for a designated LAN zone. Each port shall be labeled designating the port's destination outlet and port number. All conductors of all cables shall be terminated at both ends Contractor shall coordinate exact connection requirements with hospital IT personnel prior to any installation.

H. Data Outlets: Provide Panduit Category 6 RJ-45 Outlet as indicated on drawings. Contractor shall coordinate exact connection and outlet requirements with hospital IT personnel prior to any in-

stallation.

SUBMITTALS

A. Section 01330 – Submittal Procedures.

B. Product Data: Submit for category 6 outlet, category 6 cable, category 6 patch panel.

C. Send copy of submittal to UMC IT department for review.

D. Test Reports: Reports shall show the field test performed to verify compliance with the specified performance criteria. Test reports shall include record of the physical parameters verified during testing.

PART 2 - PRODUCTS

HORIZONTAL DISTRIBUTION WIRING SYSTEM REQUIREMENTS

A. The data/telephone cable shall be Commscope Systimax # 2071E category 6 U/UTP 23AWG with bisecector. Color shall be yellow. Cable shall be rated CMP.

B. All cabling shall be installed by Commscope Systimax certified contractor. Coordinate requirements with hospital IT personnel.

C. Cable protection will be of the highest concern. The cable sheath shall be protected from sharp edges. Where cables pass over a sharp edge, a bushing or grommet shall be inserted to protect the cable.

D. To reduce EMI induced into the cabling from fluorescent lights, cable sheath shall be installed in a hanging pathway in the area above the drop ceilings to maintain proper clearance of 12 centimeters (five inches) from fluorescent lights.

E. Testing after installation and termination will be required to ensure a rating to Category 6 performance. The cable's outer sheath shall be "blue" in color for data.

F. Horizontal cabling shall be installed in a star topology. Each work area outlet must be cabled directly to a horizontal cross connect in the appropriate equipment closet.

G. Splices shall not be permitted for twisted-pair horizontal cabling.

H. Bridged taps (multiple appearances of the same cable pairs at several distribution points) shall not be permitted in the horizontal cable.

I. In all cases where the overall cable length allows, an additional 1.5 meters or 5 feet of slack shall be allowed for in the equipment closet.

J. In all cases where the overall cable length allows, an additional 30 centimeters on 12 inches of cable slack shall be allowed for at the outlet location.

K. In no case shall the slack allowances cause the overall length of the cable to exceed the limits as described in this section.

L. Horizontal Cable Lengths: The maximum horizontal cable length from the cross connect panel to the workstation outlet shall not exceed 90 meters or 295 feet meeting requirements o . An additional 10- meter or 33-foot allowance has been made for the combined length of patch cables and cables used to connect equipment in the work area and equipment rack.

M. Category 6 High Speed LAN Data specifications

N. Commscope Systimax # 2071E category 6 U/UTP 23AWG. See testing specification for Category 6 performance - Execution for Attenuation and NEXT requirements.

O. All cabling shall be installed by Commscope Systimax certified contractor. Coordinate requirements with hospital IT personnel.

JACKS AND PATCH PANELS

A. FAX- Panduit Category 3 rated #CJ88EIY to all connecting hardware appropriate for use with UTP cables specified the EIA/TIA-568-C3. Color shall be ivory. Provide separate patch panels for telephone and data wiring (match existing). Contractor shall coordinate exact connection requirements with hospital IT personnel prior to any installation.

B. Data, Telephone, TV Panduit Category 6 rated #CJ688TPBL to all connecting hardware appropriate for use with UTP cables specified in the EIA/TIA-568-C3. Color shall be black. Components used shall be characterized up to a minimum 6 certifications and typically intended for emerging technologies and applications. Provide a minimum of 10% spare ports in patch panel. Contractor shall coordinate exact connection requirements with hospital IT personnel prior to any installation.

C. Modular patch panels shall be Panduit #CPPL48WBLY. Color shall be black. Modular patch panel with molded snap-in faceplates. Provide complete assembly as required.

SUPPORT PRODUCTS

A. All Data/Telephone cabling shall be in conduit or cable tray. Refer to Section 16130 - Conduit, and j-hook system**.** J-hook system shall match existing. J-hooks shall be sized and spaced to meeting cable manufacturer and cabling standards. J-Hook system shall be capable of carrying 25% additional cables.

PART 3 - EXECUTION

A. All cabling shall be installed by Commscope Systimax certified contractor. Coordinate requirements with hospital IT personnel. Contractor

B. shall provide Category 6 Cable, Category 6 Patch Panels, Category 6 Outlets, Equipment Rack and Mounting hardware for LAN HUB. All communication cables shall be terminated and tested. Contractor shall coordinate exact connection requirements with hospital IT personnel prior to any installation.

C. CABLE DISTRIBUTION

D. The contractor shall wire the building as indicated on the contract drawings in accordance with standards. The building shall be wired using a universal wire plan that must accommodate the cables described in this specification. The wiring plan is designed to provide adequate pairs to support the campus LAN system’s high-speed data connections.

E. All cabling shall be installed by Commscope Systimax certified contractor. Coordinate requirements with hospital IT personnel. Cable shall be rated CMP.

F. Panduit Category 6, RJ-45 modular connections shall be wired to meet Commscope Systimax Requirements.

G. Contractor shall coordinate exact connection requirements with hospital IT personnel prior to any installation.

H. Placement relative to nearby noise sources, such as electric power wiring, radio frequency (RF) sources, large motors and generators, induction heaters, fluorescent light ballast, etc. shall be avoided. If necessary, place exposed cables not closer than 1.2 meters (four feet)

from large motors or transformers, 30 centimeters (one foot) from conduit and cables used for electrical power distribution and twelve centimeters (five inches) from fluorescent lighting.

I. Unless otherwise instructed by this specification installation shall be in compliance with EIA/TIA-568-C1, TIA-568-2, TIA-569, NFPA 70, UL Standards, Telecommunications Cabling Standard, EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces, and ANSI/NFPA 70 National Electric Code. Installation shall also meet any additional manufacturer's requirements to fulfill warranty specifications.

J. Provide a minimum of 1.5 meters (five feet) of cable slack in the equipment cabinets and 30 centimeters (twelve inches) at the outlet for each cable run to accommodate for future cabling system changes.

USER WORK AREA

A. Distribution of drop locations will be as indicated on the contract documents. Provide the following at each outlet location: Minimum Telephone/Data – one (1) Category 6 jack (RJ-45) Data. One (1) Category 3 jack for each fax machine. Coordinate location of fax machines with UMC personnel. A Contractor shall provide yellow cable color and ivory cover plate with hospital IT personnel prior to any installation. All cabling shall be installed by Commscope Systimax certified contractor. Coordinate requirements with hospital IT personnel. Cable shall be rated CMP.

B. Coverplates/faceplate shall be Panduit #CFPL2EIY. Mini-com single gang 2-port and #CFPL4EIY. Mini-com single gang 4-port

Labeling

A. All data outlets, patch panel ports, and both ends of each cable shall be clearly and neatly labeled. Two cable identification schemes will be used, one for the end of the cable in the work area, and one for the end of the cable at the patch panel. The labeling schemes shall be as existing. Coordinate labeling requirements with hospital IT personnel.

B. Patch Panel Scheme: The first portion of the I.D. number will correspond with the room number to which the cable runs.

EQUIPMENT CLOSETS

A. Equipment racks shall be bolted to the floor slab. Cable guides shall be bolted or screwed to racks. Racks shall be installed level.

B. Patch Panels: High density, low profile patch panels shall be used in all locations. Patch panels may vary in number of ports provided, but shall be of the same manufacturer and series, for all closets. All patch panels will be populated with port counts that equal or exceed total ports needed, plus 10%, for each closet.

C. UTP Patch Panels

D. All patch panels used to terminate UTP cables shall comply with selected vendors channel rating for Category 6.

E. Patch cables connecting data work ports to the LAN switches shall be Category 6 compliant, both cordage and couplers. Patch cables shall be constructed of stranded cable. Although the switches and other active components will be provided by the owner, all patch cables shall be provided by the contractor to provide connection to these active components. The contractor shall also provide each site a quantity of spare patch cables equal to 10% of the total used at that site. Patch cables shall be appropriately sized to allow for a neat and maintainable system.

F. All ports will be labeled in accordance with the labeling scheme described in this specifica-

tion.

TESTING

A. Horizontal Wiring Testing: Testing of all data horizontal UTP cables shall be performed in accordance with EIA/TIA TSB-1152 to ensure rating of Category 6 performance. Test parameters shall include wire mapping, attenuation, NEXT and noise measurements to verify a limit below 100mV.

B. All distribution plant facilities associated with the new wiring system shall be tested and verified after installation activities and all major plant rearrangements have been completed. Tested copper pairs shall conform to the design guidelines as specified, as well as manufacturer's standards. Cable plant testing of the data jack will diagnose the presence of all open-loop conductors, noisy lines and distortion, low-loop current, high-loop loss, ringer failures, grounded, shorted or crossed conductors, dB loss, split connections, attenuation range, and/or near-end cross-talk. The contractor will supply complete testing and correction reports/information and explanation to the government, or designated representative, for review prior to acceptance of the system(s). The contractor and the government or designated representative will develop a mutually acceptable format for recording and reporting of testing results prior to the start of testing activities. All errors are to be corrected at the contractor's expense prior to providing the completed records.

C. Perform Category 6 link tests in accordance with EIA TIA/EIA-568-C.1 and EIA TIA/EIA-568-C.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay and delay skew.

D. A wire map test will be performed as per TIA/EIA TSB-568-C.3. This test will be used to verify pair to pin termination at each end and check for installation connectivity errors.

E. Horizontal Wiring Testing (Test from both ends)

F. The following parameters will be measured from both sides of the link:

G. Attenuation - a measure of signal loss in the link.

H. Near-end crosstalk loss (NEXT) - a measure of signal coupling from one pair to another within a UTP cabling link and is derived from swept/stepping frequency voltage measurements.

Noise Testing

A. The noise level testing associated with the data circuit will only be required if problems occur with the previous test procedures, or if the manufacturer requests it for warranty purposes. If tested, it shall be measured over seven different frequencies.

B. Noise will be measured by recording interference from all outside sources (for example, power cables). The noise is generally steady throughout the entire frequency range and permanently exists. Acceptable levels will be the lower of, the manufacturers' specifications, or less than 100mV.

C. Noise peaks will be measured by adjusting a threshold. All peaks that exceed the threshold will be documented. Acceptable peaks will be determined by the manufacturer's specifications, or by IEEE 802.3 10BaseT Ethernet Standards.

Additional Testing

A. Any additional testing and/or documentation required by the manufacturer to show full compliance with warranty requirements shall be provided to the government by the contractor. Final test results will meet manufacturer's guidelines for the cabling channel.

B. Telecommunications Cabling Testing

C. Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA-568-C.1, EIA TIA/EIA-568-C.2, EIA TIA/EIA-568-C.3, and TIA-568-2. Perform optical fiber field inspection tests via attenuation measurements on factory reels and provide results along with manufacturer certification for factory reel tests. Remove failed cable reels from project site upon attenuation test failure. All fiber optic, data, and telephone cables shall be terminated and tested.

D. For multimode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with EIA TIA/EIA-568-C.3 and EIA TIA/EIA-526-14 using Method A, Optical Power Meter and Light Source for multimode optical fiber.

END OF SECTION 271500

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM WITH VOICE EVACUATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Existing UMC's Fire alarm control panel is manufactured by Notifier.
2. Manual fire alarm boxes.
3. System smoke detectors.
4. Notification appliances.
5. Remote annunciator.
6. Addressable interface device.
7. Digital alarm communicator transmitter.

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. NICET: National Institute for Certification in Engineering Technologies.

1.4 SYSTEM DESCRIPTION

A. Noncoded, UL-certified addressable system, with multiplexed signal transmission, dedicated to fire alarm service only.

B. Noncoded addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire alarm service only.

1.5 SUBMITTALS

A. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:

a. Trained and certified by manufacturer in fire alarm system design.
b. NICET-certified fire alarm technician, Level III minimum.
c. Licensed or certified by authorities having jurisdiction.

B. Product Data: For each type of product indicated.

C. Shop Drawings: For fire alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
7. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire alarm Level III technician.

C. Source Limitations for Fire Alarm System and Components: Obtain fire alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL.

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

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

H. NFPA Certification: Obtain certification according to NFPA 72 by

1.7 PROJECT CONDITIONS

A. Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Architect and Owner no fewer than three days in advance of proposed interruption of fire alarm service.

2. Do not proceed with interruption of fire alarm service without Architect's and Owner's written permission.

1.8 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of new fire alarm system, remove existing disconnected fire alarm equipment and wiring.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. The UMC’s existing fire alarm control panel is manufactured by NOTIFIER. The FACP has an adjacent voice evacuation module. The fire alarm system is located in basement. Field verify existing conditions prior to bidding project. Lubbock Sound shall provide and install all work associated with UMC’s side of the fire alarm system.
2. Lubbock Sound shall coordinate all work associated with this project.
3. All new fire devices and wiring shall be compatible with the existing Notifier fire alarm control panel.
4. Contractor shall match existing wiring configuration of fire alarm system SLC, NAC, communication circuits.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.
2. Smoke detectors.
3. Duct mounted smoke detectors.
4. Voice evacuation module

2.3 MANUAL FIRE ALARM BOXES

A. Contractor shall notifier Manual Fire Alarm Boxes(match existing): Comply with UL 38. Boxes shall be finished in “RED” with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. New pull stations shall match existing style and color for each fire alarm system as required.
2. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire alarm control unit.
3. Station Reset: Key- or wrench-operated switch.

4. Match existing pull station style and color.

2.4 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. New smoke detectors shall match existing style and color.
2. Comply with UL 268; operating at 24-V dc, nominal.
3. Detectors shall be four wire type.
4. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire alarm control unit.
5. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
6. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
7. Integral Visual-Indicating Light: LED type indicating detector has operated.
8. Retain subparagraph below for analog-addressable system where remotely adjustable detectors are to be used.
9. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire alarm control unit.

B. Photoelectric Smoke Detectors:
1. New Notifier smoke detectors shall match be compatible with each fire alarm control panel.
2. Detector address shall be accessible from fire alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
3. An operator at fire alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

4. Photoelectric Duct-Mounted Smoke Detector: The detector housing shall be UL listed specifically for use in air handling system. Provide duct-mounted sample tube with detector. For each duct-mounted smoke detector provide a remote status/test switch mounted on the ceiling below the unit. New Notifier smoke detectors shall match existing style and color.
5.

C. Intelligent Thermal Detectors:

Provide addressable, fixed temperature 135 degrees F detectors where indicated. Utilize 200 degree F detectors in kitchen area.

2.5 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.

B. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections. Color shall be “RED” to match existing.
2. New fire alarm audible/visual devices shall be ceiling mounted as indicated on plans.
3. New fire alarm device shall match existing style and color.

C. Audible: Comply with UL 464. The audible portion of the device shall have a sound output level of at least 90 dBA measured at 10 feet from the device. This visual portion of the devices shall meet the requirements of the American’s with Disability’s Act and the Texas Accessibility Standards. Minimum candela level for the strobe light intensity shall be 75 and the flash rate shall be a minimum of 1 Hz and a maximum of 3 Hz. The maximum flash duration shall be two-tenths of one second. It is the Contractor’s responsibility to provide additional amplifiers, speaker, wire and conduit to meet all requirements of NFPA.

D. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch-high letters on the lens.

1. Rated Light Output:

a. 75 cd.
b. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted unless otherwise indicated.
3. Match existing style and color for each fire alarm system.
4. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
5. Flashing shall be in a temporal pattern, synchronized with other units.
6. Strobe Leads: Factory connected to screw terminals.
7. Mounting Faceplate: Factory finished, “RED”.

E. Voice/Tone Notification Appliances:

1. Match existing style and color for each fire alarm system. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.
2. High-Range Units: Rated 2 to 15 W.
3. Low-Range Units: Rated 1 to 2 W.
4. Mounting: Semi-recessed.
5. Matching Transformers: Tap range matched to acoustical environment of speaker location.

2.6 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire alarm equipment.

B. Equipment Mounting: Install fire alarm control unit on concrete base with tops of cabinets not more than 72 inches above the finished floor. Retain first subparagraph below if Project requires seismic bracing. Coordinate with Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Equipment Mounting: Install fire alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
2. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

D. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Connect new equipment to existing control panel in existing part of the building.
2. Connect new equipment to existing monitoring equipment at the supervising station.
3. *Expand, modify, and supplement existing [control] [monitoring] equipment as necessary to extend existing [control] [monitoring] functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.*

E. Smoke- or Heat-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
3. Smooth ceiling spacing shall not exceed 30 feet.
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.

G. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

H. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

I. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

J. Audible Alarm-Indicating Devices: device shall be installed in ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

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

3.2 CONNECTIONS

A. For fire protection systems related to doors in fire rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire alarm system.

1. Verify that hardware and devices are NRTL listed for use with fire alarm system in this Section before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
1. Smoke dampers in air ducts of designated air-conditioning duct systems.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire alarm control unit.

3.4 GROUNDING

A. Ground fire alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire alarm control unit.

3.5 FIELD QUALITY CONTROL

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

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

   a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
   b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

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

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

G. Prepare test and inspection reports.

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

I. Annual Test and Inspection: One year after date of Substantial Completion, test fire alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.6 DEMONSTRATION

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

END OF SECTION 283111