INDIGENOUS DESIGN STUDIO + ARCHITECTURE, LLC

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PROJECT MANUAL - VOLUME 1

MARCH 25, 2022

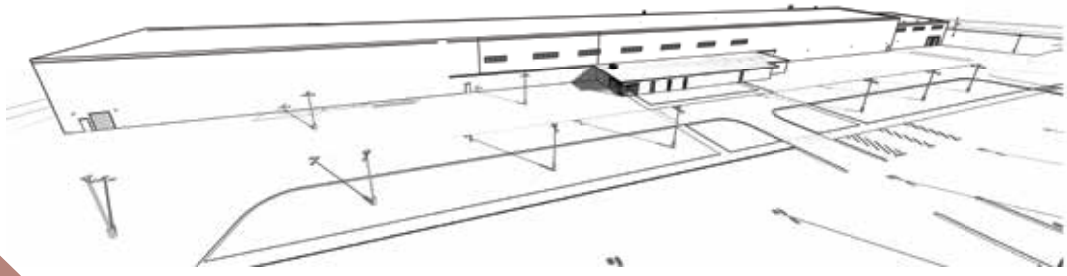
CONSTRUCTION DOCUMENTS

NOT FOR CONSTRUCTION

SEAL / CERTIFICATION

CHURCH ROCK PHASE II FACTORY

CHURCH ROCK, NEW MEXICO



SEQUENCE ___1___ OF ___2____

SET NUMBER

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 - GENERAL REQUIREMENTS

DIVISION 03 - CONCRETE

DIVISION 04 - MASONRY

DIVISION 05 - METALS

051213 ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING
053000 METAL DECKING
054000 COLD FORMED METAL FRAMING

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES
061000 ROUGH CARPENTRY
061600 SHEATHING
064116 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

DIVISION 07 - THERMAL AND MOISTURE PROTECTION
072600 UNDER SLAB VAPOR RETARDER
074213.19 INSULATED METAL WALL PANELS
075423 THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING
076200 SHEET METAL FLASHING AND TRIM
077100 ROOF SPECIALTIES
077129 MANUFACTURED ROOF EXPANSION JOINTS
077200 ROOF ACCESSORIES
079100 PREFORMED JOINT SEALS
079200 JOINT SEALANTS
079513.13 INTERIOR EXPANSION JOINT COVER ASSEMBLIES
079513.16 EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

DIVISION 08 - OPENINGS
081113 HOLLOW METAL DOORS AND FRAMES
081416 FLUSH WOOD DOORS
083323 OVERHEAD COILING DOORS
084113 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
084126 ALL-GLASS ENTRANCES AND STOREFRONTS
087100 DOOR HARDWARE
088000 GLAZING

DIVISION 09 - FINISHES
092216 NON-STRUCTURAL METAL FRAMING
092900 GYPSUM BOARD
093013 CERAMIC TILING
095123 ACOUSTICAL TILE CEILINGS
096513 RESILIENT BASE AND ACCESSORIES
096519 RESILIENT TILE FLOORING
099600 WATER TANK COATINGS
099123 INTERIOR PAINTING

DIVISION 10 - SPECIALTIES
101400 INTERIOR SIGNAGE
102113.17 PHENOLIC-CORE TOILET COMPARTMENTS
102600 WALL AND DOOR PROTECTION

102800	TOILET, BATH, AND LAUNDRY ACCESSORIES
104413	FIRE PROTECTION CABINETS
104416	FIRE EXTINGUISHERS
105113	METAL LOCKERS
107516	GROUND-SET FLAGPOLES

DIVISION 12 - FURNISHINGS

122413	ROLLER 0WINDOW SHADES
123661.16	SOLID SURFACING COUNTERTOPS
124813	ENTRANCE FLOOR MATS AND FRAMES

DIVISION 21 - FIRE PROTECTION

210500	COMMON WORK REQUIREMENTS
210503	TRENCHING & BACKFILLING
210504	PIPE AND PIPE FITTINGS
210505	PIPING SPECIALTIES
210523	VALVES
210548	VIB & SEISMIC CONTROLS
210549	FIRE SUPPRESSION & ELEC INSTALLATION COORDINATION
211313	FIRE PROTECTION SYSTEM, AUTOMATIC WET-PIPE SPRINK.

DIVISION 22 - PLUMBING

220500	COMMON WORK REQUIREMENTS
220503	TRENCHING & BACKFILLING
220504	PIPE AND PIPE FITTINGS
220505	PIPING SPECIALTIES
220523	VALVES
220549	PLUMBING & ELECTRICAL INSTALLATION COORDINATION
220700	PLUMBING INSULATION
221100	DOMESTIC WATER PIPING
221123	FACILITY NATURAL GAS SYSTEM
221316	SANITARY WASTE & VENT PIPING
221400	FACILITY ROOF DRAINAGE
224000	PLUMBING FIXTURES & TRIM

DIVISION 23 - HVAC

230500	COMMON WORK REQUIREMENTS FOR HVAC
230503	TRENCHING & BACKFILLING
230504	PIPE AND PIPE FITTINGS
230505	PIPING SPECIALTIES
230523	VALVES
230549	HVAC & ELECTRICAL INSALLATION COORDINATION
230550	VARIABLE FREQUENCY DRIVES
230593	TESTING, ADJUSTING AND BALANCING OF MECH. SYSTEMS

230700	MECHANICAL SYSTEMS INSULATION
230900	FACILITY MANAGEMENT SYSTEM
232313	REFRIGERANT PIPING SYSTEM AND EQUIPMENT
233000	AIR TEMPERING SYSTEM AND EQUIPMENT

DIVISION 26 - ELECTRICAL

260500	COMMON WORK RESULTS FOR ELECTRICAL
260513	MEDIUM-VOLTAGE CABLES
260519	LOW VOLTAGE ELEC. POWER CONDUCTORS AND CABLES
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533	RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
260543	UNDERGROUND DUCTS AND RACEWAYS FOR ELEC.
260544	SLEEVES AND SLEEVE SEALS FOR ELEC. RACEWAYS & CABLING
260548.16	SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS
260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
260572	OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY
260573	OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY
260574	OVERCURRENT PROTECTIVE DEVICE ARC FLASH STUDY
260800	ELECTRICAL FACILITY STARTUP/COMMISSIONING
260880	ELECTRICAL ACCEPTAMCE TESTING
260923	LIGHTING CONTROL DEVICE
261219	PAD-MOUNTED, LIQUID-FILLED, MEDIUM-VOLTAGE TRANSFORMERS
262200	LOW-VOLTAGE TRANSFORMERS
262413	SWITCHBOARDS
262416	PANELBOARD
262500	ENCLOSED BUS ASSEMBLIES
262726	WIRING DEVICES
262813	FUSES
262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS
262913.03	MANUAL AND MAGNETIC MOTOR CONTROLLERS
264113	LIGHTING PROTECTION SYSTEM SPECIFICATIONS
264313	SURGE PROTECTION FOR LOW-VOLTAGE ELEC. POWER CIRCUITS
265119	LED INTERIOR LIGHTING
265219	EMERGENCY AND EXIT LIGHTING
265613	LIGHTING POLES AND STANDARDS
265619	LED EXTERIOR LIGHTING

DIVISION 27 - COMMUNICATIONS

END OF TABLE OF CONTENTS

DOCUMENT 000101 - PROJECT TITLE PAGE

1.1 PROJECT MANUAL OUTLINE [**Not for Construction**]

A. Church Rock Phase II Factory .

B. Navajo Nation Division of Economic Development .

C. Church Rock, New Mexico .

D. Owner Project No. <**Insert number**>.

E. Architect Project No. 2020.017 .

F. <**Insert firm logo or Project image**>.

G. Indigenous Design Studio + Architecture .

H. 8008 Pennsylvania Cir. NE .

I. Albuquerque, New Mexico, 87110 .

J. Phone: 505.226.2565 .

K. Fax: <**Insert number**>.

L. Website: www.ids-a.com .

M. Issued: <**Insert date**>.

END OF DOCUMENT 000101

DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect: Tamarah Begay .

1. License Number: 5192 .

B. Civil Engineer: <**Insert name**>.

1. License Number: <**Insert number**>.

C. Structural Engineer: <**Insert name**>.

1. License Number: <**Insert number**>.

D. Plumbing Engineer: <**Insert name**>.

1. License Number: <**Insert number**>.

E. HVAC Engineer: <**Insert name**>.

1. License Number: <**Insert number**>.

F. Electrical Engineer: <**Insert name**>.

1. License Number: <**Insert number**>.

END OF DOCUMENT 000107

DOCUMENT 000115 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Listed on the Table of Contents page of the drawing set.

B. List of Drawings:

G-001	COVER SHEET
G-002	SYMBOLS, ABBREVIATIONS & PROJECT LOCATION
G-003	PHASING PLAN
G-102	CODE PLAN
C-100	OVERALL GRADING PLAN
C-101	GRADING PLAN
C-102	GRADING PLAN
C-103	GRADING PLAN
C-104	GRADING PLAN
C-105	GRADING PLAN
C-200	OVERALL UTILITY PLAN
C-201	UTILITY PLAN
C-202	UTILITY PLAN
C-300	WATER UTILITY SITE LAYOUT
C-301	PROCESS DIAGRAM
C-302	FIRE PROTECTION CIVIL DETAILS
C-303	FIRE PROTECTION CIVIL DETAILS
C-304	FIRE PROTECTION CIVIL DETAILS
C-305	ALTITUDE VALVE STATION STRUCTURAL DETAIL
C-306	ALTITUDE VALVE STATION DETAIL
C-307	THRUST TIE DETAIL
C-308	STORM INLET DETAIL
C-350	PUMP BUILDING SLAB DETAILS
C-400	OVERALL PAVING PLAN
C-401	PAVING PLAN
C-402	PAVING PLAN
S-000	COVER SHEET
S-001	ABBREVIATIONS AND LEGEND
S-002	GENERAL STRUCTURAL NOTES
S-003	GENERAL STRUCTURAL NOTES
S-100	OVERALL PHASING PLAN
S-101	FOUNDATION PLAN - AREA A COMPOUND
S-102	FOUNDATION PLAN - AREA B FACTORY
S-103	FOUNDATION PLAN - AREA C & D FACTORY
S-104	FOUNDATION PLAN - AREA E FACTORY

S-105	FOUNDATION PLAN - AREA F FACTORY
S-106	FOUNDATION PLAN - AREA H & I MECHANICAL
S-107	FOUNDATION PLAN - AREA G ADMIN
S-111	ROOF PLAN - AREA A COMPOUND
S-112	ROOF PLAN - AREA B FACTORY
S-113	ROOF PLAN - AREA C & D FACTORY
S-114	ROOF PLAN - AREA E FACTORY
S-115	ROOF PLAN - AREA F WAREHOUSE
S-116	ROOF PLAN - AREAS H & I MECHANICAL
S-117	ROOF PLAN - AREA B ADMIN
S-121	INTERMEDIATE FRAMING PLANS
S-201	BUILDING SECTIONS
S-202	BUILDING SECTIONS
S-203	BUILDING SECTIONS
S-204	BUILDING SECTIONS
S-205	WAREHOUSE BUILDING SECTIONS
S-206	MECHANICAL BUILDING SECTIONS
S-207	ADMINISTRATION BUILDING SECTIONS
S-211	FRAMING ELEVATIONS
S-212	FRAMING ELEVATIONS
S-221	BRACED FRAME ELEVATIONS
S-222	WAREHOUSE BRACED FRAME & TRUSS ELEVATIONS
S-301	FOUNDATION SECTIONS
S-501	FRAMING SECTIONS AND DETAILS
S-511	BRACED FRAME ELEVATIONS
S-601	SCHEDULES
S-701	TYPICAL CONCRETE DETAILS
S-711	STEEL CONNECTION DETAILS
S-712	TYPICAL FRAMING DETAILS
S-731	TYPICAL COLD-FORMED DETAILS
AS-101A	SITE PLAN - PHASE II
AS-101B	SITE PLAN - PHASE III
AS-101C	SITE PLAN - PHASE II ONLY
AS-102	ENLARGED SITE PLAN
AS-103	ENLARGED SITE PLAN
AS-104	ENLARGED SITE PLAN
AS-105	ENLARGED SITE PLAN
AS-106	ENLARGED SITE PLAN
AS-110	SITE DETAILS
A-100	FLOOR PLAN
A-101	FLOOR PLAN - AREA A COMP
A-102	FLOOR PLAN - AREA B FACTORY
A-103	FLOOR PLAN - AREA C FACTORY

A-104	FLOOR PLAN - AREA D FACTORY
A-105	FLOOR PLAN - AREA E FACTORY
A-106	FLOOR PLAN - AREA F WAREHOUSE
A-107	FLOOR PLAN - AREA G ADMIN
A-108	FLOOR PLAN - AREA H MECH
A-109	FLOOR PLAN - AREA I MECH
A-110	DIMENSION FLOOR PLAN - OVERALL
A-111	DIMENSION FLOOR PLAN - AREA A
A-112	DIMENSION FLOOR PLAN - AREA B
A-113	DIMENSION FLOOR PLAN - AREA C
A-114	DIMENSION FLOOR PLAN - AREA D
A-115	DIMENSION FLOOR PLAN - AREA E
A-116	DIMENSION FLOOR PLAN - AREA F WAREHOUSE
A-117	DIMENSION FLOOR PLAN - AREA G ADMIN
A-118	DIMENSION FLOOR PLAN - AREA H
A-119	DIMENSION FLOOR PLAN - AREA I
A-121	PARTITION TYPES
A-130	REFLECTED CEILING PLAN
A-131	CEILING DETAILS
A-141	ROOF PLAN - ENLARGED
A-142	ROOF PLAN - ENLARGED
A-143	ROOF PLAN - ENLARGED
A-144	ROOF DETAILS
A-145	ROOF DETAILS
A-201	EXTERIOR ELEVATIONS
A-202	EXTERIOR ELEVATIONS
A-203	EXTERIOR ELEVATIONS
A-205	PERSPECTIVE VIEWS - PHASE III BUILDOUT
A-301	BUILDING SECTIONS
A-302	WALL SECTIONS
A-303	WALL DETAILS
A-304	WALL DETAILS
A-401	ENLARGED PLANS & INTERIOR ELEVATIONS
A-402	ENLARGED PLANS & INTERIOR ELEVATIONS
A-403	SIGNAGE
A-404	SIGNAGE
A-501	MILLWORK
A-601	DOOR SCHEDULE
A-603	OPENING TYPES
I-100	FINISH PLAN - AREA G ADMIN FINISH PLAN
I-102	ROOM FINISH SCHEDULE
FX001	FIRE PROTECTION LEGEND
FX101	FIRE PROTECTION FLOOR PLAN

FX102	FIRE PROTECTION PLAN – AREA A COMP
FX103	FIRE PROTECTION PLAN – AREA B FACTORY
FX104	FIRE PROTECTION PLAN – AREA C FACTORY
FX105	FIRE PROTECTION PLAN – AREA D FACTORY
FX106	FIRE PROTECTION PLAN – AREA E FACTORY
FX107	FIRE PROTECTION PLAN – AREA F WAREHOUSE
FX108	FIRE PROTECTION PLAN – AREA G ADMIN
FX109	FIRE PROTECTION PLAN – AREA H MECH
FX110	FIRE PROTECTION PLAN – AREA I MECH
FX111	FIRE PROTECTION PLAN – AREA WWTP
P-101	PLUMBING LEGEND
PG101	PIPED GASES FLOOR PLAN
PG102	PIPED GASES FLOOR PLAN - AREA A COMP.
PG103	PIPED GASES FLOOR PLAN - AREA B FACTORY
PG104	PIPED GASES FLOOR PLAN - AREA C FACTORY
PG105	PIPED GASES FLOOR PLAN - AREA D FACTORY
PG106	PIPED GASES FLOOR PLAN - AREA E FACTORY
PG107	PIPED GASES FLOOR PLAN - AREA F WAREHOUSE
PG108	PIPED GASES FLOOR PLAN - AREA G ADMIN
PG109	PIPED GASES FLOOR PLAN - AREA H MECH.
PG110	PIPED GASES FLOOR PLAN - AREA I MECH.
PG111	PIPED GASES FLOOR PLAN - AREA WWTP
PL101	WASTE & VENT FLOOR PLAN
PL102	WASTE & VENT FLOOR PLAN - AREA A COMP.
PL103	WASTE & VENT FLOOR PLAN - AREA B FACTORY
PL104	WASTE & VENT FLOOR PLAN - AREA C FACTORY
PL105	WASTE & VENT FLOOR PLAN - AREA D FACTORY
PL106	WASTE & VENT FLOOR PLAN - AREA E FACTORY
PL107	WASTE & VENT FLOOR PLAN - AREA F WAREHOUSE
PL108	WASTE & VENT FLOOR PLAN - AREA G ADMIN
PL109	WASTE & VENT FLOOR PLAN - AREA H MECH
PL110	WASTE & VENT FLOOR PLAN - AREA I MECH
PL111	WASTE & VENT FLOOR PLAN - AREA WWTP
PL120	PLUMBING ROOF PLAN
PL121	PLUMBING ROOF PLAN - AREA A COMP
PL122	PLUMBING ROOF PLAN - AREA B FACTORY
PL123	PLUMBING ROOF PLAN - AREA C FACTORY
PL124	PLUMBING ROOF PLAN - AREA D FACTORY
PL125	PLUMBING ROOF PLAN - AREA E FACTORY
PL126	PLUMBING ROOF PLAN - AREA F WAREHOUSE
PL127	PLUMBING ROOF PLAN - AREA G ADMIN
PL-128	PLUMBING ROOF PLAN - AREA H MECH
PL-129	PLUMBING ROOF PLAN - AREA I MECH

PL-130	PLUMBING ROOF PLAN - AREA WWTP
PP101	PRESSURE PIPING FLOOR PLAN
PP102	PRESSURE PIPING FLOOR PLAN - AREA A COMP
PP103	PRESSURE PIPING FLOOR PLAN - AREA B FACTORY
PP104	PRESSURE PIPING FLOOR PLAN - AREA C FACTORY
PP105	PRESSURE PIPING FLOOR PLAN - AREA D FACTORY
PP106	PRESSURE PIPING FLOOR PLAN - AREA E FACTORY
PP107	PRESSURE PIPING FLOOR PLAN - AREA F WAREHOUSE
PP108	PRESSURE PIPING FLOOR PLAN - AREA G ADMIN
PP109	PRESSURE PIPING FLOOR PLAN - AREA H MECH
PP110	PRESSURE PIPING FLOOR PLAN - AREA I MECH
PP111	PRESSURE PIPING FLOOR PLAN - AREA WWTP
PS101	PLUMBING SITE PLAN
P-501	PLUMBING DETAILS
P-701	PLUMBING SCHEDULES
M-001	MECHANICAL LEGEND
MH101	HVAC FLOOR PLAN
MH102	HVAC FLOOR PLAN - AREA A COMP
MH103	HVAC FLOOR PLAN - AREA B FACTORY
MH104	HVAC FLOOR PLAN - AREA C FACTORY
MH105	HVAC FLOOR PLAN - AREA D FACTORY
MH106	HVAC FLOOR PLAN - AREA E FACTORY
MH107	HVAC FLOOR PLAN - AREA F FACTORY
MH108	HVAC FLOOR PLAN - AREA G ADMIN
MH109	HVAC FLOOR PLAN - AREA H MECH
MH110	HVAC FLOOR PLAN - AREA I MECH
MH111	HVAC FLOOR PLAN - AREA WWTP
MH120	MECHANICAL ROOF PLAN
M-301	MECHANICAL SECTIONS
M-501	MECHANICAL DETAILS
M-701	MECHANICAL SCHEDULES
MI001	MECHANICAL CONTROLS LEGEND
MI601	MECHANICAL CONTROLS
E-001	ELECTRICAL LEGEND
ES101	ELECTRICAL SITE PLAN
EJ102	RECEPTACLE FLOOR PLAN – AREA A COMP
EJ103	RECEPTACLE FLOOR PLAN – AREA B FACTORY
EJ104	RECEPTACLE FLOOR PLAN – AREA C FACTORY
EJ105	RECEPTACLE FLOOR PLAN – AREA D FACTORY
EJ106	RECEPTACLE FLOOR PLAN – AREA E FACTORY
EL101	LIGHTING FLOOR PLAN
EL102	LIGHTING FLOOR PLAN - AREA A COMP
EL103	LIGHTING FLOOR PLAN - AREA B FACTORY

EL104	LIGHTING FLOOR PLAN - AREA C FACTORY
EL105	LIGHTING FLOOR PLAN - AREA D FACTORY
EL106	LIGHTING FLOOR PLAN - AREA E FACTORY
EP101	POWER FLOOR PLAN
EP102	POWER FLOOR PLAN - AREA A COMP
EP103	POWER FLOOR PLAN - AREA B FACTORY
EP104	POWER FLOOR PLAN - AREA C FACTORY
EP105	POWER FLOOR PLAN - AREA D FACTORY
EP106	POWER FLOOR PLAN - AREA E FACTORY
EP120	ELECTRICAL ROOF LIGHTING - PROTECTION PLAN
EP121	ELECTRICAL ROOF PLAN - AREA A COMP
EP122	ELECTRICAL ROOF PLAN - AREA B FACTORY
EP123	ELECTRICAL ROOF PLAN - AREA C FACTORY
EP124	ELECTRICAL ROOF PLAN - AREA D FACTORY
EP125	ELECTRICAL ROOF PLAN - AREA E FACTORY
ET102	SPECIAL SYSTEMS FLOOR PLAN - AREA A COMP
ET103	SPECIAL SYSTEMS FLOOR PLAN - AREA B FACTORY
ET104	SPECIAL SYSTEMS FLOOR PLAN - AREA C FACTORY
ET105	SPECIAL SYSTEMS FLOOR PLAN - AREA D FACTORY
ET106	SPECIAL SYSTEMS FLOOR PLAN - AREA E FACTORY
E-501	ELECTRICAL DETAIL SHEET
E-601	ELECTRICAL DIAGRAMS
E-602	GROUNDING DIAGRAM
E-701	ELECTRICAL SCHEDULES
E-702	ELECTRICAL SCHEDULES
E-703	ELECTRICAL SCHEDULES

END OF DOCUMENT 000115

DOCUMENT 003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document and its referenced attachments are for information and are not part of the Contract Documents.

B. A geotechnical investigation report, prepared by Geomat, Inc. , dated April 7, 2021 , is at the office of Owner .

END OF DOCUMENT 003132

SECTION 012500 - SUBSTITUTION PROCEDURES

1.1 ACTION SUBMITTALS

A. Documentation:

1. Justification.
2. Coordination information.
3. Detailed comparison.
4. Product Data.
5. Samples.
6. Certificates and qualification data.
7. List of similar installations.
8. Material test reports.
9. Research reports.
10. Detailed comparison of Contractor's construction schedule.
11. Cost information.
12. Contractor's certification.
13. Contractor's waiver of rights to additional payment or time.

B. Architect's Action: If necessary, Architect will request additional information within [**seven**] 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection within [**15**] <**Insert number**> days of receipt, or [**seven**] <**Insert number**> days of receipt of additional information.

1.2 SUBSTITUTIONS

A. Substitutions for Cause: Not later than [**15**] <**Insert number**> days prior to time required for preparation and review of submittals.

B. Substitutions for Convenience: Not allowed [**unless otherwise indicated**].

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

1.1 SUMMARY

A. Minor Changes in the Work: AIA Document G710 , issued by Architect.

B. Owner-Initiated Work Change Proposal Requests: Issued by Architect .

C. Contractor-Initiated Work Change Proposals: Submit to Architect .

1. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

D. Change Orders: AIA Document G701 , issued by Architect for signatures of Owner and Contractor.

E. Construction Change Directives: AIA Document G714 , issued by Architect .

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

1.1 SUMMARY

A. Schedule of Values:

1. Format: Line items based on Project Manual table of contents and consistent with format of AIA Document G703 EJCDC Document C-620 <**Insert name and designation of standard form**>.
2. Provide multiple line items for principal subcontract amounts in excess of five <**Insert number**> percent of the Contract Sum.
3. Provide subschedules for phased Work .
4. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five <**Insert number**> percent of the Contract Sum and subcontract amount.

B. Applications for Payment:

1. Payment Application Times: Indicated in the Agreement <**Insert day of the month**>.
2. Payment Application Forms: AIA Document G702 and AIA Document G703 EJCDC Document C-620 Forms acceptable to Architect <**Insert name and designation of standard form**>.
3. Stored Materials: Provide evidence of certificate of insurance and transfer of title, and documentation of value.
4. Waiver of Mechanic's Lien: Submitted from entities lawfully entitled to file a lien for work covered by payment .

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

1.1 COORDINATION DRAWINGS

1.2 REQUESTS FOR INFORMATION (RFIs)

A. RFI Forms: AIA Document G716 Software-generated form acceptable to Architect.

B. Architect's Action: Allow seven <**Insert number**> days for Architect's response for each RFI.

C. RFI Log: Maintain a tabular log of RFIs. Submit log weekly <**Insert time**> . Use software log that is part of web-based Project software site.

1.3 WEB-BASED PROJECT MANAGEMENT SOFTWARE PACKAGE

A. Use Construction Manager's web-based Project software site for Project communication and documentation.

B. Provide up to two Project software user licenses for use of Owner , Architect, and Architect's consultants. Provide, if requested, 4 hours of software training at Architect's office for Project software users.

C. Provide one of the following web-based Project software packages:

1. Autodesk Inc.; Constructware.
2. Deltek, Inc.; <**Insert product designation**>.
3. Newforma, Inc.; <**Insert product designation**>.
4. Procore Technologies, Inc.; <**Insert product designation**>.
5. Viewpoint, Inc. a Trimble Company; [**Viewpoint for Projects**] [**Viewpoint Team**].

1.4 PROJECT MEETINGS

A. Schedule and conduct meetings.

B. Preconstruction conference.

C. Preinstallation Conferences: Before each construction activity that requires coordination.

D. Project Closeout Conference: No later than 90 <**Insert number**> days prior to the scheduled date of Substantial Completion.

E. Progress Meetings: At monthly <**Insert appropriate interval**> intervals, coordinated with preparation of payment requests.

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

1.1 INFORMATIONAL SUBMITTALS

A. Format for Submittals: PDF electronic file .

B. Startup construction schedule.

C. Startup network diagram.

D. Contractor's construction schedule , including working digital copy.

E. Critical path method (CPM) reports.

F. Daily Construction Reports: Submit at weekly intervals.

G. Material Location Reports: Submit at weekly intervals.

H. Site condition reports.

I. Unusual event reports.

1.2 QUALITY ASSURANCE

A. Scheduling Consultant: Experienced specialist in CPM scheduling and reporting.

1.3 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Schedule Type: Gantt chart .

B. Software: [**Microsoft Project**] [**Primavera**] [**Meridian Prolog**] <**Insert name of specific software**>, for current Windows operating system.

C. Activity Duration: No longer than 20 <**Insert number**> days.

D. Milestones: Notice to Proceed, <**Insert interim milestones**>, Substantial Completion, and final completion.

E. Updating: At monthly <**Insert time**> intervals, issued one week <**Insert time**> before each progress meeting.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

1.1 FORMATS AND MEDIA

A. Digital Photographs: High-resolution JPG format, taken with camera with <**Insert number**>-megapixel sensor size.

B. Digital Video Recordings: High-resolution MPEG format, taken with recorder with high-definition, 12 <**Insert number**>-megapixel sensor size.

1.2 CONSTRUCTION PHOTOGRAPHS

A. Preconstruction Photographs:

1. Take 20 <**Insert number**> photographs showing existing conditions adjacent to property before starting the Work.
2. Take 20 <**Insert number**> photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

B. Concealed Work Photographs: Record nature and location of concealed Work, including underground and underslab services, piping, electrical conduit, waterproofing and weather-resistant barriers [**, and**] <**Insert description of Work**>.

C. Periodic Construction Photographs: Take 20 <**Insert number**> photographs weekly <**Insert time interval**>.

D. Time-Lapse Sequence Construction Photographs: Take 20 <**Insert number**> photographs weekly <**Insert time interval**>.

E. Final Completion Construction Photographs: Take 20 <**Insert number**> color photographs.

1.3 CONSTRUCTION VIDEO RECORDINGS

A. Preconstruction Video Recording: Before starting work.

B. Periodic Construction Video Recordings: Monthly <**Insert time interval**> Minimum recording time shall be five minutes(s).

C. Time-Lapse Sequence Construction Video Recordings: One frame every five minutes <**Insert time interval**> to create a time-lapse sequence of <**Insert time**> in length.

1.4 CONSTRUCTION WEBCAM

A. Provide one webcam(s) in fixed location; with static view.

B. Web-Based Interface: For navigating and viewing images.

C. Web-Based Photographic Documentation: Submit time-lapse sequence video recordings by posting to web-based Project website .

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

1.1 SUBMITTALS

A. Submit submittal schedule.

1.2 PROCEDURES

A. Prepare and submit submittals as PDF uploaded to online Project management software website.

B. Processing Time:

1. Initial Review: 15 <**Insert number**> days.
2. Resubmittal Review: 15 <**Insert number**> days.
3. Sequential Review: 21 <**Insert number**> days.
4. Concurrent Consultant Review: 15 <**Insert number**> days.

C. Certificates and Certifications Submittals: Includes signature of entity responsible for preparing certification. Provide a digital signature on electronically submitted certificates and certifications where indicated.

D. Delegated Design Services Certification: In addition to other required submittals, submit digitally signed PDF electronic file and three <**Insert number**> paper copies of certificate, signed and sealed by the responsible design professional.

E. BIM Incorporation: By Contractor .

F. Contractor's Submittal Review: Mark with approval stamp before submitting to Architect.

END OF SECTION 013300

SECTION 013516 - ALTERATION PROJECT PROCEDURES

1.1 QUALITY ASSURANCE

A. Specialist qualifications.

B. Alteration work program for whole Project.

C. Fire-prevention plan.

1.2 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Storage Space:

1. On-site by Owner [**, includes security**] [**, does not include security**] [**and**] [**climate control**].
2. Off-site by Contractor.

1.3 PROTECTION

A. Protection:

1. Barricades, barriers, and temporary directional signage for public and fire egress.
2. Temporary protective covers over walkways.
3. Surface protection along haul routes.
4. Sound-control treatment.
5. Utility Services: [**Give notifications**] [**disconnect and cap services**] [**and**] [**maintain existing services and provide temporary services during interruptions**].
6. Test drains before start of work.
7. Protect existing roofing.

B. Fire Protection:

1. General: NFPA 241. [**Perform duties titled "Owner's Responsibility for Fire Protection."**] Provide fire extinguishers, fire blankets, and rag buckets.
2. Heat-Generating Equipment: Open-flame equipment [**is restricted**] [**is not permitted**] . [**Obtain approval for high-heat equipment.**]
3. Trained Fire Watch:
   a. Final Fire-Safety Inspection: [**30 minutes**] <**Insert time**> after conclusion of work.
   b. Maintain fire-watch personnel until [**60 minutes**] [**two hours**] <**Insert time**> after conclusion of daily work.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

1.1 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.

C. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction.

1.2 QUALITY ASSURANCE

A. Delegated Design Services: For products and systems assigned to Contractor to be designed and certified by Contractor's design professional to be in compliance with performance and design criteria.

B. Qualifications:

1. Contractor's quality-control personnel.
2. Manufacturer.
3. Fabricator.
4. Installer.
5. Professional engineer performing delegated design services.
6. Specialists.
7. Testing agency.
8. Manufacturer's technical representative.
9. Factory-authorized service representative.

C. Preconstruction testing.

D. Mockups: For each form of construction and finish required, using materials indicated for the completed Work.

1. Demonstrate the proposed range of aesthetic effects and workmanship.
2. Maintain mockups as a standard for judging the completed Work.
3. Demolish and remove mockups when directed unless otherwise indicated.

E. Integrated Exterior Mockups: Construct according to approved Shop Drawings .

1.3 QUALITY CONTROL

A. Owner Responsibilities: Where indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Payment will be made from testing and inspecting allowances.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility.

C. Manufacturer's field services.

D. 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.

E. Associated Services: Access to the Work, taking and storing samples [**, and delivery of samples to testing agency**].

F. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

G. Test and inspection log.

H. Repair and Protection: Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

1.1 USE CHARGES

A. Sewer Service: Pay charges .

B. Water Service: Pay charges .

C. Electric Power Service: Pay charges .

1.2 INFORMATIONAL SUBMITTALS

A. Moisture-protection plan.

B. Noise- and vibration-control plan.

C. Fire-safety program.

D. Dust- and HVAC-control plan.

1.3 MATERIALS

A. Chain-link fencing.

B. Portable chain-link fencing.

C. Wood enclosure fence.

1.4 TEMPORARY FACILITIES

A. Common-Use Field Office: Prefabricated or mobile units.

B. Storage and fabrication sheds.

1.5 EQUIPMENT

A. Fire extinguishers.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained heaters with individual space thermostatic control.

1.6 INSTALLATION, GENERAL

A. Isolation of work areas in occupied facilities.

1.7 TEMPORARY UTILITY INSTALLATION

A. Sewers and drainage.

B. Water Service: Install water service .

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water.

D. Heating and Cooling: Provide temporary heating and cooling required by construction activities.

E. Ventilation and humidity control.

F. Electric Power Service: Provide overhead service .

G. Lighting: Provide temporary lighting.

H. Telephone Service: Provide temporary telephone service in common-use facilities.

I. Electronic Communication Service: Provide WiFi access points, Internet service in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications.

1.8 SUPPORT FACILITIES INSTALLATION

A. Temporary Roads and Paved Areas: Locate temporary roads and paved areas as indicated on Drawings.

B. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas.

C. Parking: Provide temporary parking areas.

D. Dewatering Facilities and Drains: Maintain Project site, excavations, and construction free of water.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1.9 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Temporary erosion and sedimentation control.

B. Stormwater control.

C. Tree and plant protection.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

1.1 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Use means and methods that will prevent damage, deterioration, and loss, including theft.

B. Store products to allow for inspection and measurement or counting of units.

C. Provide for storage of materials and equipment by Owner.

1.2 PRODUCT WARRANTIES

A. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1.3 PRODUCT SELECTION PROCEDURES

A. Sole Product: Product named that complies with requirements.

B. Sole Manufacturer/Source: Product by manufacturer or from source named that complies with requirements.

C. Limited List of Products: One of the products listed that complies with requirements. Comparable products will not be considered unless otherwise indicated.

D. Limited List of Manufacturers: Product by one of the manufacturers listed that complies with requirements. Comparable products will not be considered unless otherwise indicated.

E. Basis-of-Design Product: Either the specified product or a comparable product by one of the other named manufacturers , approved by Architect as part of normal Project submittal.

F. Visual Matching Specification: Product that matches Architect's sample. Architect's decision will be final.

G. Visual Selection Specification: Product (and manufacturer) that complies with other specified requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

1.4 COMPARABLE PRODUCTS

A. Conditions for Consideration:

1. Product does not require revisions to the Contract Documents, is consistent with the Contract Documents and will produce the indicated results, and is compatible with other portions of the Work.
2. Comparison of proposed product with those named in the Specifications.
3. Product provides specified warranty.
4. Similar installations, if requested.
5. Samples, if requested.

END OF SECTION 016000

SECTION 017300 - EXECUTION

1.1 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.2 INFORMATIONAL SUBMITTALS

A. Qualification data.

B. Certificates: Signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Cutting and patching plan.

D. Certified Surveys: Signed by land surveyor .

E. Final property survey.

1.3 MATERIALS

A. Complete final cleaning using products that comply with Green Seal's GS-37 and the California Code of Regulations maximum allowable VOC levels.

1.4 EXECUTION

A. Existing Conditions: Existence and location of site improvements, utilities, and other construction affecting the Work must be investigated and verified.

B. Review of the Contract Documents and field conditions.

C. Construction Layout: Engage a land surveyor to lay out the Work, using accepted surveying practices.

D. Field Engineering: Owner will identify existing benchmarks, control points, and property corners. Locate existing permanent benchmarks, control points, and similar reference points.

1. Benchmarks: Establish two <**Insert number**> permanent benchmarks on Project site.
2. Certified survey of construction and sitework.
3. Final property survey.

E. Installation: Comply with manufacturer's written instructions.

1.5 CUTTING AND PATCHING

A. Provide temporary support.

B. Protect in-place construction.

C. Protect adjacent occupied areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Minimize interruption to occupied areas.

E. Cutting: In general, use hand or small power tools. Cut holes and slots neatly to minimum size required. Temporarily cover openings when not in use.

F. Patching: Patch with durable seams that are as invisible as practicable.

G. Finishes: Restore exposed finishes. Extend new finishes to perimeter of patched surface. Leave patched work indistinguishable from existing undisturbed work.

1.6 PROGRESS CLEANING

A. Clean Project site and work areas daily. Dispose of materials lawfully.

B. Keep installed work clean.

C. Remove debris from concealed spaces.

1.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation.

B. Adjust equipment for proper operation.

1.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure Work is without damage.

1.9 CORRECTION OF THE WORK

A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

1.1 SUSTAINABILITY REQUIREMENTS

A. LEED 2009 NC :

1. Waste materials.

1.2 SUMMARY

A. Salvaging nonhazardous construction waste.

B. Recycling nonhazardous construction waste.

C. Disposing of nonhazardous construction waste.

1.3 PERFORMANCE REQUIREMENTS

A. End-of-Project Rates for Salvage/Recycling: 50 <**Insert number**> percent.

1.4 WASTE MANAGEMENT PLAN

A. Types and quantities of construction waste.

B. Type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator.

C. Net additional cost or net savings resulting from waste management plan.

1.5 PLAN IMPLEMENTATION

A. Engage a waste management coordinator.

B. Train workers, subcontractors, and suppliers on proper waste management procedures.

C. Recycling Incentives: Revenues and other incentives for recycling will [**be shared equally by Owner and Contractor**].

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

1.1 CLOSEOUT PROCEDURES

A. Prepare and submit Contractor's list of incomplete items (punch list) in the form of upload to web-based Project management website .

B. Submit closeout items required in other Sections.

C. Submit Project warranties.

D. Complete final cleaning using products that comply with Green Seal's GS-37 and the California Code of Regulations maximum allowable VOC levels.

E. Replace bulbs that are dim or burned out.

F. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

G. Touch up or repair finishes.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

1.1 SUMMARY

A. Procedures for preparing the following manuals:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

1.2 PRODUCTS

A. Format:

1. PDF electronic files on digital media acceptable to Architect .
2. Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, one <**Insert number**> set(s) of copies.

B. Directory Manuals: Organized reference to emergency, operation, and maintenance manuals.

C. Emergency Manuals: Types of emergencies, emergency instructions, and emergency procedures.

D. Operation Manuals: System, subsystem, and equipment descriptions; operating procedures; wiring diagrams; control diagrams and sequence of operation; and piped system diagrams.

E. Product Maintenance Manuals: Source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds.

F. Systems and Equipment Maintenance Manuals: Source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

1.1 RECORD DOCUMENTS

A. Record Drawings:

1. Initial Submittal: PDF electronic files .
2. Final Submittal: One paper-copy set PDF electronic file .

B. Record Specifications: One paper copy set Annotated PDF electronic files.

C. Record Product Data: One paper copy set Annotated PDF electronic files and directories.

D. Miscellaneous Record Submittals: One paper copy set Annotated PDF electronic files and directories.

E. Record Digital Data Files: Corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

1.1 INSTRUCTION PROGRAM

A. Provide training for each system and for equipment not part of a system , presented by factory-authorized service representatives.

B. Program Structure: Provide training modules for each of the following:

1. Basis of system design, operational requirements, and criteria.
2. Documentation.
3. Emergencies.
4. Operations.
5. Adjustments.
6. Troubleshooting.
7. Maintenance.
8. Repairs.

C. Facilitator to prepare instruction program and training modules and to coordinate instructors.

D. Evaluation: Assess participant mastery with demonstration performance-based test.

1.2 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Record demonstration and training video recordings produced by professional videographer. Provide written transcript of each recording.

END OF SECTION 017900

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes formwork for cast-in-place concrete, including water stops, and installation of embedded items.

1.2 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcement

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

C. Section 07 26 00 - Under-Slab Vapor Retarder

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM); latest version

1. ASTM D226 - Specification for Asphalt - Saturated Organic Felt used in Roofing and Waterproofing
2. ASTM D1751 - Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

1.4 QUALITY ASSURANCE

A. Comply with the American Concrete Institute Standard, ACI 347-04, Recommended Practice for Concrete Formwork.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Forms for Exposed Finish Concrete: Plywood complying with Voluntary Product Standard PS 1-07 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better or metal, metal-framed plywood or other acceptable panel-type materials. Plywood shall be mill-oiled and edge-sealed, with each piece bearing legible inspection trademark. Furnish in largest practicable sizes to minimize number of joints. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.

B. Forms for Unexposed Finish Concrete: Use plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Form Coatings: Commercial formulation that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

D. Chamfer Strips: ¾ inch by ¾ inch wood, PVC, or rubber.

E. Preformed Construction Joint: 24-gage steel, galvanized, shaped to form a continuous tongue and groove key.

F. Preformed Control Joint: Rigid plastic or metal strip with removable top section.

G. Expansion Joint Material: Asphalt saturated fiberboard, ½ inch thick, meeting the requirements of ASTM D 1751.

H. Felt: Asphalt-saturated organic felt, weighing 30 pounds per 100 square feet, meeting the requirements of ASTM D 226.

I. Water stops: PVC, meeting the requirements of CRD-C572. Provide 6 inches wide dumbbell shape water stop with 3/16-inch minimum web thickness and 3/8 inch minimum end bulb diameter.

J. Recycled Content: Minimum 5 percent post-consumer content, or minimum 20 percent pre-consumer recycled content at contractor’s option.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel. Set screeds accurately. Embedded items shall be accurately aligned and adequately supported. Verify installation of mechanical, plumbing, and electrical items to be embedded in concrete. Correct any unsatisfactory condition before proceeding further.

3.2 PREPARATION

A. Form Coating: Coat contact surfaces of forms with a form coating compound before reinforcement is placed. Thin form-coating compounds with thinning agent and apply as specified in manufacturer's instructions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed.

3.3 INSTALLATION

A. Formwork: Formwork shall support vertical and lateral loads that are applied until such loads can be supported by concrete structure. Formwork shall be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials. Construct forms to sizes, shapes, lines and dimensions shown. Perform surveys to obtain accurate alignment. Provide for recesses, chamfers, blocking, anchorages, inserts, and other features required in work. Select materials to obtain required finishes. Butt joints solidly and provide backup at joints to prevent leakage of cement paste.

B. Chamfer Strips: Provide at exposed corners and edges.

C. Form Ties: Use factory fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal.

D. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.4 INSTALLATION OF EMBEDDED ITEMS

A. General: Set anchorage devices and other embedded items accurately. Use setting drawings, diagrams, templates and printed instructions provided by supplier. Secure embedded items such that they are not displaced during placement of concrete.

B. Water stops: Install according to manufacturers printed instructions. Splice water stop sections using square cut butt joints and fuse sections together with indirect heat from preheated splicing iron. Use of direct flame is prohibited.

1. Place water stops in all concrete construction joints in basement walls around the building perimeter that are exposed to soil, weather, or moisture, and in any other construction joints that have the potential to allow water infiltration into the building.

3.5 JOINTS

A. Construction Joints in Elevated Slabs and Beams: Construction joints in Elevated Slabs, Beams, Grade Beams, and other flexural members shall only be made as shown in the contract drawings or as approved by the Engineer of Record. Joints shall be constructed in accordance with ACI 318 Section 6.4 with provisions made for the transfer of shear and other forces. Reinforcement shall be continuous through these joints unless noted otherwise.

B. Construction Joints in Walls, Foundations, and Slabs on Grade: Provide keyways at least 1 ½ inches deep in vertical construction joints in walls and construction joints in slabs on grade and foundations. Discontinue every other horizontal bar through slab on grade construction joints unless noted otherwise.

C. Preformed Construction Joint for Slabs on Grade: Secure with galvanized steel stakes, 1/8 inch thick by 1-1/8 inches wide with ½ inch deep rib and tapered point. Splice adjoining joints with 24 guage steel, galvanized splice plates.

D. Isolation Joints in Slabs on Grade: Construct isolation joints in interior slabs using 30 lb. felt. Provide isolation joints at points of contact between slabs on grade and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated. Construct isolation joints on exterior slabs abutting vertical surfaces with ½ inch thick expansion joint material.

E. Control Joints in Slabs-on-Grade:

1. Preformed Strip: Insert premolded rigid plastic, or metal strip into fresh concrete. Cut groove for strip using 10-foot long straight edge cutting tool. Depths of strip shall be one fourth of slab thickness. Press strip into groove such that top of strip is level with the concrete surface. Pull off removable top section, if any, prior to troweling.
2. Saw Cut: Contractor may saw cut control joints instead of using preformed strips. Saw cut joints shall be 1/8 inch wide. Saw cut depth should equal 1/4 of slab depth. Cut joints after concrete has hardened sufficiently to prevent raveling; usually 4 to 12 hours after slab has been cast and finished. Use diamond or silicone-carbide blades.

F. Control Joints in Walls: Create weakened planes in cantilevered retaining walls at 25 feet on center. Use preformed strips, placed vertically, full height in each face of wall. Depth of strips shall be one inch.

3.6 REMOVAL OF FORMWORK

A. General: Prevent excessive deflection, distortion, and damage to concrete when forms are stripped. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

B. Formwork and supports at sides of concrete shall remain in place for 24 hours after concrete placement. This period represents cumulative number of hours, not necessarily consecutive, during which the temperature of the air surrounding the concrete is above 50 degrees F. Formwork and shoring which support the weight of concrete shall not be removed until concrete has attained its specified compressive strength.

C. Ensure safety of the structure. Do not superimpose any load on concrete until forms are removed and concrete is cured.

3.7 RE-USE OF FORMS

A. General: Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are intended for successive concrete placement, thoroughly clean surfaces and remove fins and latence. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes fabrication and installation of deformed bar and welded wire fabric reinforcing steel.

1.2 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories

B. Section 03 30 00 - Cast In Place Concrete

1.3 REFERENCE STANDARDS:

A. American Concrete Institute (ACI), latest versions:

1. ACI 301 - Specifications for Structural Concrete for Buildings
2. ACI 315 - Details and Detailing of Concrete Reinforcement
3. ACI 318 - Building Code Requirements for Structural Concrete

B. American Society for Testing and Materials (ASTM), latest versions:

1. ASTM A82/A82M - Standard Specification for Steel Wire, plain, for Concrete Reinforcement
2. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
3. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

C. Concrete Reinforcing Steel Institute (CRSI). Design Handbook, latest version

1.4 SUBMITTALS

A. Shop Drawings: Submit shop drawings for reinforcing steel. Comply with ACI 315 requirements showing layout, bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of reinforcing steel. Shop Drawings shall not be made by reproduction of the Contract Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60. Stirrups and ties may be Grade 40.

B. Welded Wire Fabric: ASTM A 185, flat sheets.

C. Steel Wire: ASTM A 82, 16 gage.

D. Supports for Reinforcing Steel: Wire bar type and precast concrete block type meeting the requirements of CRSI Manual of Standard Practice.

2.2 FABRICATION

A. Fabricate reinforcing steel in accordance with fabricating tolerances in ACI 315.

B. Do not fabricate reinforcing steel until shop drawings are approved.

PART 3 - EXECUTION

3.1 PLACING BAR SUPPORTS

A. General: Provide bar supports meeting the requirements of CRSI Specification for Placing Bar Supports.

B. Slabs-on-grade: Use supports with sand plates or precast concrete blocks or horizontal runners where base material will not support chair legs.

3.2 PLACING REINFORCING STEEL

A. General: Comply with CRSI Code of Standard Practice for "Placing Reinforcing Bars".

B. Clean reinforcing steel of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcing steel against displacement by formwork, construction, or concrete placement operations. Place reinforcing steel to obtain minimum coverages. Arrange, space and securely tie bars and bar supports to hold reinforcing steel in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

1. Concrete Cover:

Concrete cast against and permenently exposed to earth or weather	3 inches
Bars larger than No. 5	2 inches
Bars No. 5 or smaller	1 1/2 inches

D. Rebar Splices: Locate at points of minimum stress or as shown on contract drawings. Unless noted otherwise, provide lap splices 30 bar diameters (18 inches minimum) in length.

E. Welded Wire Fabric Splices: Lap one complete wire spacing.

F. Corner Reinforcing: Provide corner bars of same size and spacing as horizontal reinforcing steel. Lap with horizontal reinforcing 30 bar diameters or 18 inches minimum length.

G. Reinforcing at Construction/Control Joints: Continue reinforcing steel through construction joints unless noted otherwise. Discontinue reinforcing steel 2 inches

from preformed construction joints in slabs-on-grade. Cut alternate longitudinal bars at weakened plane control joints in walls.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section covers cast-in-place concrete including finishing, surface repair and curing.

1.2 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories

B. Section 03 20 00 - Concrete Reinforcement

C. Section 07 26 00 - Under Slab Vapor Retarder

1.3 REFERENCE STANDARDS

A. Meet the requirements of the following codes, specifications and standards.

1. American Concrete Institute (ACI) Publications, latest versions:

    a. ACI 301 - Specifications for Structural Concrete for Buildings

    b. ACI 305.1 - Standard Specification for Hot Weather Concreting

    c. ACI 306.1 - Standard Specification for Cold Weather Concreting

    d. ACI 318 - Building Code Requirements for Structural Concrete.

2. ASTM International (ASTM), latest versions:

    a. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field

    b. ASTM C33/C33M - Standard Specification for Concrete Aggregates

    c. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

    d. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete

    e. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

    f. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

    g. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete

h. ASTM C150/C150M - Standard Specification for Portland Cement

i. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete

j. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete

k. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

l. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

m. ASTM C260/C260M - Standard Specification for Air Entraining Admixtures for Concrete

n. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

o. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete

p. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete

q. ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete

r. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

s. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and admixtures.

B. Concrete Mix Design:

1. Submit mix design in accordance with ACI-301, Section 4.
2. Submit with mix design results of laboratory tests performed within previous 12 months indicating aggregates from the proposed source comply with the requirements of ASTM C 33 or C 330 as applicable.
3. Submit the proposed area of use for each mix design submitted (footings, stemwalls, slabs, walls, columns, etc.).

C. Granular Base Course: Submit gradation, plasticity index, and wear information.

D. Test Reports: Submit copies of test reports for concrete compressive strength, air content, temperature and slump. Submit copies of granular base course test reports.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment .Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities.

B. Environmental Requirements: Manufacturer and Contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where Project is located. Notify A/E in writing if variations to Specifications herein are required.

1. V.O.C. content shall be a maximum 250 (55) gm/liter, unless more stringent codes or laws apply.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, low alkali. Use one brand of cement throughout project.

B. Normal Weight Aggregates: ASTM C 33. Provide aggregates from a single source for exposed concrete.

C. Water: Potable.

D. Air-Entraining Admixture: ASTM C 260.

E. Water Reducing Admixture: ASTM C 494.

F. Fly-Ash: ASTM C 618.

G. Moisture-Retaining Cover: Provide waterproof paper, polyethylene film, or polyethylene-coated burlap meeting the requirements of ASTM C 171.

H. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound meeting the requirements of ASTM C 309; Type 1-D with fugitive dye for interior concrete and foundations; Type 2, white pigmented, for exposed exterior concrete except exposed exterior Architectural concrete, use Type 1-D.

Curing compound shall NOT be used on interior slabs, except exposed integrally colored concrete slabs. Curing compound to be used on integrally colored concrete slabs shall be approved by the manufacturer of the color.

I. Vapor Retarder shall comply with Section 07 26 00 of these Specifications.

J. Granular base shall meet the following grading requirements when tested in accordance with ASTM C 136.

Granular base shall meet the gradation and material properties requirements as listed in the General Structural Notes.

The plasticity Index shall be no greater than 3 when tested in accordance with ASTM D 4318. The coarse aggregate shall have a percent wear of 50 or less when tested in accordance with ASTM C 131

2.2 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial mixture or field experience methods as specified in ACI 301, Section 4. If trial mixture method is used, employ an independent testing facility, acceptable to Architect, for preparing and reporting proposed mix designs.

B. Submit written reports to Architect, or Engineer, of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been approved.

C. Refer to the General Structural Notes for concrete strengths.

D. Slabs-on-ground or on vapor retarder shall have a water/total cementitious ratio not to exceed 0.45.

E. Admixtures

1. Use water reducing admixture conforming to ASTM C 494, Type A, in all concrete unless approved otherwise by the Structural Engineer.
2. All other admixtures shall have the written approval of the Architect or Structural Engineer.
3. Calcium chloride is not permitted.
4. All admixtures, except high range water reducers, shall be added to the concrete at the batch plant.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel. Set screeds accurately. Embedded items shall be accurately aligned and adequately supported. Verify installation of mechanical, plumbing, and electrical items to be embedded in concrete. Correct any unsatisfactory condition before proceeding further.

3.2 PREPARATION

A. Before placing concrete, clean and roughen surface of previously placed concrete. Clean reinforcing steel. Remove debris, providing clean-outs at bottom of forms when necessary. Moisten surfaces to receive concrete unless otherwise prepared. Remove excess water before placing concrete.

3.3 CONCRETE PLACEMENT

A. General: Comply with ACI 301.

B. Place concrete continuously in layers not deeper than 24 inches. Concrete shall not be placed against concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints. Deposit concrete as nearly as practicable to its final location to avoid segregation. Do not use vibrators to transport concrete.

C. Maintain reinforcing in proper position during concrete placement operations.

D. Consolidate concrete, immediately after placing, by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

E. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface. Do not disturb slab surfaces prior to beginning finishing operations.

F. Cold Weather Concreting: Protect concrete work from physical damage or reduced strength caused by frost, freezing or low temperatures. Comply with ACI 306.1.

G. Hot Weather Concreting: When hot weather conditions exist that would impair quality and strength of concrete, reduce delivery time of ready mix concrete, lower the temperature of materials, or add retarder to ensure that the concrete is plastic. Retempering with water is not allowed. Comply with ACI 305R.

3.4 FINISH OF FORMED SURFACES

A. Rough Form Finish: Provide where formed concrete surfaces are not exposed to view. Tie holes and surface imperfections shall be repaired and patched and fins and other projections exceeding ¼ inch in height rubbed down or chipped off.

3.5 FINISH OF HORIZONTAL SURFACES

A. At tops of foundation walls and grade beams finish with a texture matching adjacent formed surfaces unless otherwise indicated.

3.6 SLAB FINISHES

A. Float Finish: Begin floating when surface water has disappeared and when concrete has stiffened sufficiently to permit operation of power-driven or hand floats. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding ¼ inch in 10 feet when tested with a 10 foot straightedge.

B. Scratch Finish: Apply scratch finish to slab surfaces that are to receive floor topping. Roughen surface before final set, using stiff brushes, or brooms.

C. Trowel Finish: Apply trowel finish to all slab surfaces unless noted otherwise. After floating, begin first trowel finish using a power-driven or hand trowel. Finish concrete surface by a final hand-trowel operation, free of trowel marks, and uniform in texture and appearance. The final surface finish for slabs-on-grade shall have a

minimum FF = 25 and a minimum FL = 20 per ACI requirements. Verify with Architectural requirements.

D. Broom Finish: Apply on exterior slabs, ramps, steps, and sidewalks. Immediately after concrete has received a float finish, draw a broom or burlap belt across the surface to give a coarse transverse scored texture.

3.7 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Continue curing for at least 7 days.

B. Moisture-retaining Cover curing: All interior concrete slabs, except exposed integrally colored concrete slabs, are to be cured with a moisture retaining cover for the first 7 days. After that time, the cover shall be removed and the slab should be allowed to dry. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed. Repair any holes or tears in cover during curing period.

C. Curing compound: At contractor’s option, exterior concrete slabs may be cured using curing compound. All vertical concrete (walls, beams, etc…) shall be cured using curing compound – apply compound to the vertical surface as soon as the forms are removed. Apply curing compound uniformly in accordance with the manufacturer's printed instructions. Curing compound shall NOT be used on interior slabs, except exposed integrally colored concrete slabs.

D. Exposed integrally colored concrete slabs: Use curing compound recommended by the concrete supplier. Apply with an airless sprayer.

3.8 CONCRETE SURFACE REPAIRS

A. Patching Surface Imperfections: Remove loose material and patch surface imperfections and holes left by tie rods with cement mortar. Surface imperfections include honeycomb, excessive air voids, sand streaking and cracks.

3.9 FOR EXPOSED-TO-VIEW SURFACES

A. Blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

3.10 FIELD QUALITY CONTROL

A. The Owner shall employ the services of a qualified testing laboratory to perform tests and submit test reports.

B. Sampling Fresh Concrete: ASTM C 172.

C. Slump: ASTM C 143; one test for each set of compressive strength test specimens.

D. Air Content: ASTM C 173 or C 231 for each set of compressive strength test specimens.

E. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below, when 80 degrees F and above; and when compression test specimens are made.

F. Compression Test Specimen: ASTM C 31, one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cure test specimens are required. Mold one set of standard cylinders for volume of concrete specified below or fraction thereof.

Slabs on Grade or Metal Deck	30 cubic yards
Footings and Stem Walls	50 cubic yards
All Other Locations (unless otherwise noted)	30 cubic yards

G. Compressive Strength Tests: ASTM C 39; test 1 specimen at 7 days, 2 specimens at 28 days, and retain one specimen in reserve for later testing. Additional Tests: The testing laboratory will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure as directed by the Architect. The testing laboratory may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by the Architect or Engineer. The Owner shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

H. Granular Base Course: ASTM C 136 and ASTM D 4318 for every 500 square yards of building slab area.

END OF SECTION 033000

SECTION 033300 - ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place architectural concrete, including form facings, reinforcement accessories, concrete materials, concrete mixtures, concrete placement, and concrete finishes.
2. Requirements in Section 033000 "Cast-in-Place Concrete" apply to this Section.

1.2 DEFINITIONS

A. Aggregate Exposure: Projection of coarse aggregate from matrix or mortar after completion of exposure operations.

B. Cast-in-Place Architectural Concrete: Concrete that is exposed to view, is designated as architectural concrete, and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.

C. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

D. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of cast-in-place architectural concrete.

E. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Form-facing panels.
2. Form joint tape.
3. Form joint sealant.
4. Wood sealer.
5. Form-release agent.
6. Form ties.
7. Bar supports.
8. Portland cement.
9. Fly ash.
10. Aggregates.
11. Admixtures:

a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

B. Shop Drawings:

1. Formwork: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

C. Samples: For each of the following materials:

1. Form-facing panels.
2. Form ties.
3. Form liners, 12-by-12-inch Sample, indicating texture.
4. Exposed aggregates.
5. Chamfers and rustications.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.

B. Material Test Reports: For the following, by a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Aggregates [**: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity**].

1.5 QUALITY ASSURANCE

A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Installer Qualifications: An experienced cast-in-place architectural concrete installer, as evidenced by not less than five consecutive years' experience, specializing in installing cast-in-place architectural concrete similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1. Provide written evidence of qualifications and experience.

2. Include locations, descriptions, and photographs of completed projects, including name of architect, substantiating the quality of the installer's experience.

C. Field Sample Panels: After approval of verification sample and before casting architectural concrete, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, cast vertically, approximately 48 by 48 by 6 inches minimum, to demonstrate the expected range of finish, color, and texture variations.

1. Locate panels as indicated or, if not indicated, as directed by Architect.
2. Demonstrate methods of curing, aggregate exposure, wood sealers, and coatings, as applicable.
3. In presence of Architect, damage part of an exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
4. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
5. Demolish and remove field sample panels when directed.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1. Include the following information in each test report:
   a. Admixture dosage rates.
   b. Slump.
   c. Air content.
   d. Seven-day compressive strength.
   e. 28-day compressive strength.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 FORM-FACING MATERIALS

A. Comply with Section 031000 "Concrete Forming and Accessories" for formwork and other form-facing material requirements, and as specified in this Section.

B. Form-Facing Panels for As-Cast Finishes:

1. Exterior-grade plywood panels, nonabsorptive, that will provide continuous, true, and smooth architectural concrete surfaces, medium-density overlay, Class 1, or better, mill-applied release agent and edge sealed, complying with DOC PS 1.

C. Rustication Strips: Metal or rigid plastic, with sides beveled and back kerfed; nonstaining; in longest practicable lengths.

D. Chamfer Strips: Metal, rigid plastic, elastomeric rubber, or dressed wood, 3/4 by 3/4 inch, minimum; nonstaining; in longest practicable lengths.

E. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800; minimum 1/4 inch thick.

F. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or Type S, Grade NS, that adheres to form joint substrates, does not stain, does not adversely affect concrete surfaces, and does not impair subsequent treatments and finishes of concrete surfaces.

G. Wood Sealer: Penetrating, clear, polyurethane wood sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood and does not stain, does not adversely affect concrete surfaces, and does not impair subsequent treatments and finishes of concrete surfaces.

H. Form-Release Agent: Commercially formulated, colorless form-release agent that does not bond with, stain, or adversely affect architectural concrete surfaces and will not impair subsequent treatments and finishes of architectural concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, glass-fiber-reinforced plastic or removable ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter on architectural concrete surface.
2. Furnish internally disconnecting ties that will leave no metal closer than 1-1/2 inches from architectural concrete surface.
3. Furnish glass-fiber-reinforced plastic ties, not less than 1/2 inch and not more than 1 inch in diameter, of color selected by Architect from manufacturer's full range.
4. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place.

1. Manufacture bar supports in accordance with CRSI's "Manual of Standard Practice."
2. Where legs of wire bar supports contact forms, use CRSI Class 1, gray, plastic-protected [**or**] CRSI Class 2, stainless steel bar supports.

2.4 CURING MATERIALS

A. Comply with Section 0330000 "Cast-in-Place Concrete."

2.5 CONCRETE MIXING

A. Ready-Mixed [**or**] Architectural Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

1. Clean equipment used to mix and deliver cast-in-place architectural concrete to prevent contamination from other concrete.
2. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
3. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
4. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with Section 031000 "Concrete Forming and Accessories" for formwork, embedded items, and shoring and reshoring, and as specified in this Section.

B. Limit deflection of form-facing panels to not exceed ACI 301 requirements.

C. Limit cast-in-place architectural concrete surface irregularities, as follows:

1. Surface Finish-3.0: ACI 117Class A, 1/8 inch.

D. Construct forms to result in cast-in-place architectural concrete that complies with ACI 117.

E. Seal form joints, chamfers, rustication joints, and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.

1. Provide closure backing materials if indented rustication is used over a ribbed form line, and seal joint between rustication strip and form with joint sealant.

F. Chamfer exterior corners and edges of cast-in-place architectural concrete.

G. Coat contact surfaces of wood rustications and chamfer strips with wood sealer before placing reinforcement, anchoring devices, and embedded items.

H. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement, anchoring devices, and embedded items.

3.2 INSTALLATION OF REINFORCEMENT AND ACCESSORIES

A. Comply with Section 032000 "Concrete Reinforcing" for fabricating and installing steel reinforcement and accessories.

3.3 JOINTS

A. Construction Joints: Install construction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.

3.4 CONCRETE PLACEMENT

A. Comply with Section 033000 "Cast-in-Place Concrete."

3.5 FINISHING FORMED SURFACES

A. Comply with Section 033000 "Cast-in-Place Concrete."

B. Architectural Concrete Finish: Match Architect's design reference sample, identified and described as indicated, to satisfaction of Architect.

3.6 CONCRETE CURING

A. Comply with Section 033000 "Cast-in-Place Concrete" using identical curing procedures to that used for field sample panels .

3.7 REPAIR

A. Comply with ACI 301.

B. Repair damaged finished surfaces of cast-in-place architectural concrete when repairing is approved by Architect.

C. Match repairs to color, texture, and uniformity of surrounding surfaces and to repairs on approved field sample panels .

D. Remove and replace cast-in-place architectural concrete that cannot be repaired to Architect's approval.

3.8 FIELD QUALITY CONTROL

A. Comply with Section 033000 "Cast-in-Place Concrete."

3.9 CLEANING

A. Clean cast-in-place architectural concrete surfaces after finish treatment to remove stains, markings, dust, and debris.

B. Wash and rinse surfaces in accordance with concrete finish applicator's written instructions.

1. Protect other Work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural concrete finishes.

3.10 PROTECTION

A. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.

B. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.

3.11 FINAL ACCEPTANCE

A. Final acceptance of completed architectural concrete Work will be determined by Architect by comparing approved design reference sample field sample panels with installed Work, when viewed at a distance of 20 feet .

END OF SECTION 033300

SECTION 033543 - POLISHED CONCRETE FINISHING

1.1 QUALITY ASSURANCE

A. Field sample panels.

B. Mockups.

1.2 SUSTAINABILITY REQUIREMENTS

A. LEED 2009 NC, CS, or CI :

1. Low-emitting flooring.

1.3 PRODUCTS

A. Reactive stains.

B. Penetrating stains.

C. Penetrating liquid floor treatment.

1.4 POLISHING

A. Polish: Level 2: Low sheen, 400 grit .

END OF SECTION 033543

SECTION 042200 - REINFORCED UNIT MASONRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes the construction of reinforced hollow core unit masonry, masonry veneer and special shapes. It includes all split face units and smooth face units, as well as masonry mortar and grout.

1.2 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcement

B. Division 07 Section “Water Repellents” for water repellents applied to unit masonry assemblies.

C. Division 07 Section “Sheet Metal Flashing and Trim” for exposed sheet metal flashing.

D. Division 07 Section “Fire stopping” for fire stopping at tops of masonry walls and at openings in masonry walls.

E. Division 08 Section “Louvers and Vents” for wall vents (brick vents).

F. Products furnished, but not installed, under this Section include the following:

1. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 05 Section “Structural Steel” and Division 13 Section “Metal Building Systems”.

G. Products installed, but not furnished, under this Section include the following:

1. Cast-stone trim, furnished under Division 04 Section “Cast Stone”.
2. Steel lintels for unit masonry, furnished under Division 05 Section “Metal Fabrications”.
3. Manufactured reglets in masonry joints for metal flashing, furnished under Division 07 Section “Sheet Metal Fabrications”.
4. Hollow-metal frames in unit masonry openings, furnished under Division 08 Section “Steel Doors and Frames”.

1.3 REFERENCE STANDARDS

A. ASTM International (ASTM), latest versions;

1. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
2. ASTM C90 - Standard Specification for Load bearing Concrete Masonry Units
3. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Pain and reinforced Masonry
4. ASTM C270 - Standard Specification for Mortar for Unit Masonry
5. ASTM C476 - Standard Specification for Grout for Masonry

6. ASTM C1019 - Standard Test Method for Sampling and Testing Grout

B. American Concrete Institute (ACI), latest versions:

1. ACI 530.1 - Specification for Masonry Structures

1.4 SUBMITTALS

A. Product Data: Submit sample of exposed masonry unit of each color and texture to be used to complete the work. Submit copies of test reports performed within last 12 months for representative specimens to be used in accordance with ASTM C 140 for strength, absorption and moisture content, and ASTM C 426 for drying shrinkage.

B. Test Reports: Submit copies of test reports for masonry units, mortar and grout.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Store masonry units above ground on level platforms, which allows air circulation under stacked units.

B. Cover and protect against wetting prior to use.

C. Handle units on pallets or flat bed barrows.

D. Store cementitious ingredients in weather-tight enclosures.

E. Waste Management and Disposal: As specified in Division 01 Section “Construction Waste Management” and as follows:

1. Separate and recycle waste materials in accordance with the Waste Management Plan and to the maximum extent economically feasible.

   a. Fold up metal banding; flatten and place in designated area for recycling.

   b. Collect wood packing shims and pallets; place in designated area.
2. Recycling: Undamaged, excess masonry materials are Contractor’s property and shall be removed from the Project site for his use.
3. Disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil contaminated sand, by crushing and mixing with fill material as fill is placed.

   a. Crush masonry waste to less than 2 inches in greatest dimension.

   b. Mix masonry waste with at least 2 parts specified fill material for each part masonry waste. Fill material is specified in Division 31 Section “Earth Moving”.

   c. Do not dispose of masonry waste as fill within 18 inches of finished grade.

4. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste and legally dispose of off Owner's property.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hollow Core Split Faced Scored Units: ASTM C 90.

B. Hollow Core Units: ASTM C90.

C. Aggregate: Natural color at concealed block.

D. Mortar: ASTM C 270 "Standard Specification for Mortar for Unit Masonry," Type S, f'c = 1800psi.

E. Grout: ASTM C 476 "Standard Specification for Grout for Masonry."

F. Cell Reinforcing: ASTM A 615 "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," Grade 60. Comply with Section 03 20 00.

G. Bond Beam and Lintel Reinforcing: ASTM A 615, Grade 60. Comply with Section 03 20 00.

H. Joint Reinforcing: Hot Dipped Galvanized, Standard Ladder Type 9 Gage Wire Dur-O-Wal or approved equal.

I. Control Joint Material: Rubber, neoprene or PVC joint material for use with standard sash block by Dur-O-Wal or approved equal.

J. Vertical Bar Positioner: Steel by Dur-O-Wal or approved equal.

K. Mortar Plasticizer: Easy Spread by American Colloid Company or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide jamb, header, lintel, bond beam, etc. units as required to complete the work. Lay only dry and unfrozen masonry units.

B. All exposed masonry shall be scoria aggregate, split face, scored finish unless noted otherwise on the drawings. Masonry not exposed to view may be smooth finished.

C. Discard any broken, chipped, or discolored masonry units.

D. Use masonry saws to cut and fit masonry units.

E. Lay units in running bond pattern with vertical joints located at center of masonry units in alternate course below.

F. Set units plumb, true to line and with level courses accurately spaced.

G. Adjust masonry unit to final position while mortar is soft and plastic.

H. Anchors, flashing accessories and similar devices shall be built in as masonry progresses.

3.2 MORTAR

A. Mix all cementitious materials and sand in a mechanical batch mixer for a minimum of 5 minutes. Adjust the consistency of the mortar to the satisfaction of the mason, but add only as much water as is compatible with convenience in using the mortar. If the mortar begins to stiffen from evaporation or from absorption of a pat if the mixing water, re-temper the mortar immediately by adding water, and remix the mortar.

B. Mortar for exterior walls shall have waterproofing added in accordance with the manufacturer's recommendations.

C. Addition of admixtures or re-tempering of mortar at the mixer to extend its use will not be permitted.

3.3 RE-TEMPERING

A. All mortar shall be used within 2-1/2 hours of initial mixing and no mortar shall be used after it has begun to set. Re-tempering of mortar in which setting has saturated will not be permitted. However, mortar shall be re-tempered, except as above qualified, as necessary to keep it plastic.

3.4 JOINTS

A. Provide joints 3/8 inch nominal thickness and tooled unless shown otherwise on drawings.

B. Construct uniform joints.

C. Units shall be placed with sufficient pressure to extrude mortar and provide a tight joint.

3.5 REINFORCEMENT

A. Reinforcement shall be secured against displacement prior to grouting at a spacing not greater than 4 feet.

B. Provide rebar lap lengths specified in the General Structural Notes on the drawings. Provide 6 inches minimum lap for all ladder type joint reinforcing.

3.6 GROUTING

A. Grout all cells, which are below grade.

B. Grout lintel blocks over masonry openings and each jamb of masonry openings.

C. Grout pours shall not exceed 5 feet in height.

D. Grout all cells solid, which contain reinforcing.

Grout shall have a slump range of 8 to 11 inches tested in accordance with ASTM C143.

Consolidate grout pours 12 inches or less in height by mechanical vibration or by puddling. Consolidate pours exceeding 12 inches in height by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred. Typically this occurs within 2-4 minutes of placement of grout.

Place grout within 1-1/2 hours from introducing water in the mixture and prior to initial set.

3.7 POINTING AND CLEANING

A. At completion of unit masonry work, fill holes in joints and tool.

B. Cut out and repoint defective joints.

C. Dry brush masonry surface after mortar has set, at end of each day's work and after final pointing.

D. Leave work and surrounding surfaces clean and free of mortar spots and droppings.

3.8 PROTECTION OF WORK

A. Protect sills, ledges, and offsets from mortar drippings or other damage during construction.

B. Remove misplaced mortar or grout immediately.

C. Cover top of walls with non-staining waterproof coverings when work is not in progress.

D. Provide adequate bracing during construction to prevent damage from wind loads.

3.9 WEATHER CONDITIONS

A. Do not place concrete masonry units when air temperature is below 20 degrees F.

B. For temperatures between 20 degrees F and 40 degrees F, sand and mixing water shall be heated to produce mortar temperatures between 40 degrees F and 120 degrees F. Mortar shall be maintained above 32 degrees F during placement.

C. Masonry shall be protected from freezing for 24 hours after placement.

3.10 FIELD QUALITY CONTROL

A. The Owner shall employ the services of a qualified testing laboratory to perform tests and submit test reports.

B. Concrete Masonry Units (CMU): Test in accordance with ASTM C 140. “Standard Test Methods of Sampling and Testing Concrete Masonry Units.” Six units shall be sampled and tested for each lot of 10,000 units or less delivered to the job site. Twelve units shall be sampled from each lot of more than 10,000 units and less than 100,000 units.

C. Mortar: By proportions according to ASTM C 780 “Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Masonry.”

D. Grout: Mold and test 4 test specimens in accordance with ASTM C 1019 “Test Method for Sampling and Testing Grout” from each day’s grout placement. Test grout slump prior to each day’s grouting process. Submit slump value with test specimen results. See General Structural Notes for required strength.

END OF SECTION 042200

SECTION 051000 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes the fabrication and erection of structural steel.

1.2 RELATED REQUIREMENTS

A. Section 05 21 00 - Steel Joists

B. Section 05 30 00 - Metal Deck

C. Section 09 90 00 - Painting and Coating

1.3 REFERENCE STANDARDS:

A. ASTM International (ASTM), latest versions:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded Seamless
3. ASTM A61/A61M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
5. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
6. ASTM A490 - Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
7. ASTM A500-A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
8. ASTM A992/A992M - Standard Specification for Structural Steel Shapes
9. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (non-shrink)
10. ASTM F1554 AE1 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

B. American Welding Society (AWS), latest edition

1. AWS D1.1 Structural Welding Code-Steel

C. American Institute of Steel Construction (AISC), Steel Construction Manual, latest edition.

1. Specification for Structural Steel Buildings
2. AISC Code of Standard Practice
3. Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

1.4 QUALITY ASSURANCE

A. Qualifications of Fabricator: Fabricator shall have a minimum of 5 years experience in the fabrication of structural steel of structures of similar size. Fabricator shall have AISC or IAS certification or other certification as approved by the building official and the engineer of record. If the fabricator does not have approved certification, special inspection shall be done on the fabrication process and on the fabricated material as required by Section 1704.2, Inspection of Fabricators of the International Building Code. The non-certified fabricator shall engage a special inspector that meets the requirements of IBC section 1704.1 and is acceptable to the building official and the engineer of record. Provide documentation verifying certification or provide special inspector information for approval prior to issuance of a building permit.

B. Qualifications of Erector: Erector shall have a minimum of 5 years experience in the erection of structural steel of structures of similar size.

C. Qualifications of Field Welders: Welders shall be certified in accordance with AWS D1.1 within the last 12 months.

1.5 SUBMITTALS

A. Shop Drawings: Submit shop drawings including erection plans, complete details and schedules for fabrication and assembly of structural steel members. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Shop drawings shall not be made by reproduction of the Contract Drawings.

B. Provide setting drawings and directions for installation of anchor bolts and other anchorages to be installed by others.

C. Welder Certification: Submit affidavit stating that all welders are certified in accordance with AWS and provide copies of welder’s certificates.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Support structural steel above ground on skids, pallets, platforms, or other supports.

B. Protect steel from damage.

C. Store packaged materials in original unbroken package or container.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures.

E. Replace damaged shapes or members.

F. Waste Management and Disposal; As specified in Division 01 Section “Construction Waste Management” and as follows: Collect cut offs and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

PART 2 - PRODUCTS

3.1 MATERIALS

A. All Wide Flange Shapes shall conform to ASTM A 992, Grade 50 unless noted otherwise.

B. All Angles, Channels, Plates, and Bars: ASTM A 36.

C. Structural Steel Pipe: ASTM A 53, Type E or S, Grade B Fy=35 ksi

D. Rectangular or Square Hollow Structural Section: ASTM A 500, Grade B, Fy=46 ksi.

E. Round Hollow Structural Sections: ASTM A 500, Grade B, Fy=42 ksi.

F. Anchor Bolts: ASTM F1554, Grade 36

G. High Strength Tension Control Threaded Fasteners: Meet requirements of ASTM A 325 or ASTM A 490.

H. Headed Anchor Shear Studs: By the Nelson Division of TRW.

I. Welding Electrodes: E 70 Series.

J. Shop Primer Paint: Fabricators standard rust inhibitive primer.

K. Non-Metallic, Non-Shrink Grout: Meets the requirements of ASTM C 1107.

L. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time. Grout shall have a minimum 28 day compressive strength of 6,000 psi.

1. Subject to compliance with requirements, provide products by one of the following or an approved equal:

    a. Five Star Fluid Grout 100; Five Star Products, Inc., Fairfield, Connecticut.

    b. Crystex; L&M Construction Chemicals, Inc. Omaha, Nebraska.

    c. Sure-Grip High Performance Grout; Dayton superior Corp., Miamisburg, Ohio.

    d. Sonnogrout 10K; Sonneborn Building Products, Shakopee, Minnesota.

    e. Sealight Pac-It Grout; W.R. Meadows, Inc., Hampshire, Illinois.

    f. Enduro 50; Conspec Marketing & Manufacturing Co., Inc, Kansas City, Kansas.

3.2 FABRICATION

A. Fabrication shall be in accordance with the AISC "Code of Standard Practice for Buildings and Bridges".

B. Connections: Weld or bolt shop connections as indicated on the approved shop drawings. Design connections to support reactions and forces where indicated on the drawings.

C. Shop Welds: Shall be visually inspected by the Fabricator’s quality control department.

3.3 SHOP PAINTING

A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete, mortar or to receive sprayed on fireproofing. Paint embedded steel, which is partially exposed on exposed portions and initial 2 inch of embedded areas only.

B. Do not paint surfaces, which are to be welded or high-strength bolted with friction-type connections.

C. Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-1 "Solvent Cleaning"
2. SP-2 "Hand Tool Cleaning"
3. SP-3 “Power Tool Cleaning”. For Architecturally Exposed Structural Steel, AESS, see Architectural drawings for locations.

D. Painting: After surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions. Provide one coat.

PART 3 - EXECUTION

4.1 COORDINATION

A. Field Measurements: Verify all elevations, locations, and dimensions of surfaces to receive structural steel.

B. Anchor Bolts and Other Embedded Items: Verify locations and positions of anchor bolts and other embedded items used to support structural steel.

All Anchor bolts for column base plates, anchors and bearing plates for beams shall be located prior to installation by a Registered Professional surveyor. The Professional Surveyor shall use project control points, such as bench marks, grid lines, or building corners established and accurately maintained by the General Contractor for vertical and horizontal control of location. Templates shall be used to locate groupings of bolts or anchors and shall be confirmed as to orientation and hole geometry accuracy

Anchor bolts and bearing plates with anchors shall be stabilized against movement, vertical and horizontal, prior to and during concrete casting of concrete supporting these devices.

Upon completion of the concrete casting the Professional Surveyor shall verify vertical and horizontal locations and orientation of anchor bolts or bearing plates with anchors. A report shall be furnished to the Engineer of Record (through the General Contractor and Architect) noting non compliant locations. The EOR, will furnish remedial actions required to correct the non compliant anchor bolt or bearing plate locations. Allow ten days for the EOR's report on remedial actions necessary

It shall be the General Contractor's responsibility to have this work performed.

C. Correct any unsatisfactory conditions prior to erection of structural steel.

4.2 PREPARATION

A. Clean surfaces to receive structural steel prior to erection.

4.3 ERECTION

A. General: Erect structural steel in accordance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Field Assembly: Assemble structural steel accurately to the lines and elevations shown on the drawings. Align and adjust components accurately before fastening.

C. Temporary Bracing: Provide temporary bracing or guys to secure structural steel against wind, seismic, or construction loads. It is the responsibility of the Contractor to maintain stability of the structure during erection.

D. Field Bolted Connections: Install high strength tension control bolts in accordance with AISC Specifications for Structural Joints Using ASTM A325 and A490 Bolts and the manufacturer's instructions. Where clearance within a connection does not permit the use of tension control bolts, standard A325 bolts shall be used and inspected in accordance with the AISC Specification for Structural Joints.

E. Field Welding: Perform all welds in accordance with AWS.

F. Welded Connections: Field welds shall be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency’s option:

    a. Liquid Penetrant Inspection: ASTM E 165.

    b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

    c. Ultrasonic Inspection: ASTM E 164.

    d. Radiographic Inspection: ASTM E 94

G. Gas Cutting: Do not use gas-cutting torches in field to cut structural framing.

H. Do not enlarge unfair holes by burning. Ream holes that must be enlarged to admit bolts.

I. Field Touch-up Painting (Primer): Paint all exterior exposed bolts, washers, and nuts after connections have been tightened and checked. Paint all exterior exposed field welds. Paint all exterior exposed abrasions in shop coat. Use same paint as for shop painting.

J. Grout Placement: Comply with the manufacturer's instructions.

K. Tighten anchor bolts after supported members have been positioned and plumbed.

END OF SECTION 051000

SECTION 051213 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

1.1 SUMMARY

A. Architecturally exposed structural-steel (AESS) framing.

1. Requirements in Section 051200 "Structural Steel Framing" also apply to AESS.

1.2 DEFINITIONS

A. AESS: ANSI/AISC 303, Section 10, [**Category AESS 1**] [**Category AESS 2**] [**Category AESS 3**] [**Category AESS 4**].

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: AISC-Certified Plant, Category STD or IAS accredited, AC 172.

B. Installer Qualifications: AISC-Certified Erector, [**Category ACSE**] [**Category CSE**].

C. Shop-Painting Applicator Qualifications: AISC-Sophisticated Paint Endorsement or SSPC-QP3.

D. Mockups for AESS.

1.4 MATERIALS

A. Steel Primer: [**Latex**] [**Fabricator's standard, nonasphaltic**].

B. Etching cleaner for galvanized steel.

C. Galvanized-Steel Primer: [**Cementitious**] [**Vinyl wash primer**] [**Water based**].

1.5 FABRICATION

A. Special care used in handling and fabricating AESS according to ANSI/AISC 303.

1. Category AESS 1.
2. Category AESS 2.
3. Category AESS 3.
4. Category AESS 4.

B. Cleaning Corrosion-Resisting (Weathering) AESS: SSPC-SP 6 (WAB)/NACE WAB-3.

C. Surface Preparation: [**SSPC-SP 2**] [**SSPC-SP 3**] [**SSPC-SP 7 (WAB)/NACE WAB-4**] [**SSPC-SP 14 (WAB)/NACE WAB-8**] [**SSPC-SP 11**] [**SSPC-SP 6 (WAB)/NACE WAB-**

3] [**SSPC-SP 10 (WAB)/NACE WAB-2**] [**SSPC-SP 5 (WAB)/NACE WAB-1**] [**SSPC-SP 8**].

D. Galvanize: [**Lintels**] <**Insert description**> located in exterior walls.

1.6 ERECTION

A. AESS erected according to AISC 303 and AISC 360.

END OF SECTION 051213

SECTION 053000 - METAL DECKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide all metal decking complete in place as shown on the drawings, specified herein, and needed for a complete and proper installation.

1.2 RELATED REQUIREMENTS

A. Section 05 10 00 - Structural Steel

B. Section 05 21 00 - Steel Joists

C. Section 05 40 00 - Cold-Formed Metal Framing

1.3 REFERENCE STANDARDS:

A. ASTM International, latest versions

1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low Alloy with Improved Formability
3. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low Alloy with Improved Formability, and Ultra- High-Strength.

B. American Welding Society (AWS), latest edition.

1. D1.3 - Structural Welding Code - Sheet Steel

C. Steel Deck Institute.

1. SDI - Design Manual for Floor Decks, Form Decks and Roof Decks
2. SDI - Diaphragm Design Manual Third Edition

1.4 QUALITY ASSURANCE

A. Qualification of Field Welders: Welders shall be certified in accordance with AWS D1.3 within the last 12 months.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories.

B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Shop Drawings shall not be made by reproduction of the Contract Drawings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Support metal deck above ground on skids, pallets, platforms or other supports.

B. Protect metal deck from damage.

C. Store packaged materials in original unbroken package or container.

D. Waste Management and Disposal: As specified in Division 01 Section “Construction Waste Management” and as follows:

1. Collect off cuts and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Roof Deck: ASTM A 1008, Grade C. See plans for type, size and finish. Metal deck used in fire rated assemblies shall meet the requirements of UL. The UL mark on the product will be accepted as evidence of compliance.

B. Metal Floor Deck: ASTM A 1011 with galvanized finish. See plans for type and size.

C. Finishes:

1. Painted: Manufacturer's baked-on, rust-inhibitive paint.
2. Galvanized: Conform to ASTM A 653, G60.

PART 3 - EXECUTION

3.1 COORDINATION

A. All edge angle shall be in place with proper attachment prior to installation of metal deck. All roof and floor opening frames shall be installed prior to deck installation.

3.2 INSTALLATION

A. General: Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein. Locate deck bundles to prevent overloading of structural members.

B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

C. Place deck units in straight alignment for entire length of run.

D. Place deck units flat and square secured to adjacent framing without warp or excessive deflection.

E. Lap ends of deck units a minimum of 2 inches over supports.

F. Place deck units to permit proper attachment to the perimeter deck angle.

G. Do not use deck units for storage or working platforms until permanently secured.

H. Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.

I. Fasten deck units to steel supporting members as shown on the structural drawings.

J. Fasten side laps of units as called for on the structural drawings.

K. Care shall be exercised in the selection of electrodes and amperage to provide positive welds and to prevent high amperage blowholes.

L. Comply with AWS D1.3 requirements and procedures.

M. Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.

N. Install closure strips at all locations as recommended by the manufacturer to provide a complete installation.

O. Provide cleaning and touch-up painting of field welds, abraded areas and rust spots, as required for all exposed areas after erection and before proceeding with field painting.

END OF SECTION 053000

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes all lightgage studs, joists and track, 20 gage or heavier, including bridging, and related accessories as indicated on the Contract Drawings and specified herein.

1.2 RELATED REQUIREMENTS

A. Section 05 10 00 - Structural Steel

B. Section 05 21 00 - Steel Joists

1.3 REFERENCE STANDARDS:

A. American Iron and Steel Institute (AISI) North American Specification for the Design of Cold-Formed Steel Structural Members, latest version.

B. American Welding Society of (AWS) D1.3, Structural Welding Code-Sheet Steel.

C. ASTM International, latest version

1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low Alloy with Improved Formability
3. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low Alloy with Improved Formability, and Ultra-High-Strength

1.4 QUALITY ASSURANCE

A. Qualifications of Erector: Erector shall have a minimum of 5 years experience in the erection of structural steel of structures of similar size.

B. Qualifications of Field Welders: Welders shall be certified in accordance with AWS D1.1 within the last 12 months.

1.5 SUBMITTALS

A. Submit manufacturer's product information and installation instructions for each item of lightgage framing. Submit shop drawings for all prefabricated lightgage systems.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect metal framing units from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, and grade. Store off ground in a dry ventilated space or protect with suitable waterproof coverings.

B. Waste Management and Disposal: As specified in Division 01 Section “Construction Waste Management” and as follows:

1. Collect off cuts and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Framing:

1. All 12, 14, and 16 gage steel studs and joists shall be formed from steel that meets the requirements of one of the following standards with a minimum yield strength of 50,000 psi:

a. Painted Material - ASTM A 1011, Grade 50.

b. Galvanized Material - ASTM A 653 Grade 50.

2. All 18 and 20 gage steel studs and joists; all track, bridging and accessories shall be formed from steel that meets the requirements of one of the following with a minimum yield strength of 33,000 psi:

a. Painted Material - ASTM A 1008, Grade C.

b. Galvanized Material - ASTM A 653.

B. Material Finishes: All stud and joist components shall be primed with paint meeting the performance requirements of TT-P-1636C, or shall be formed from steel having a G-60 galvanized coating or better.

2.2 FABRICATION

A. Framing components may be prefabricated into panels prior to erection. Prefabricated panels shall be square, with components attached to prevent racking. Handling and lifting of panels shall be done in a manner as to not cause distortion in any member.

B. All framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install metal framing systems in accordance with manufacturer's printed instructions and recommendations, unless otherwise indicated on Contract Drawings.

B. Install and align tracks accurately to layout at base and tops of studs. Secure tracks as indicated on Contract Drawings. Provide fasteners at corners and ends of tracks.

C. Install supplementary framing, blocking and bracing in metal framing system to support fixtures, equipment, etc. Comply with stud manufacturer's recommendations and industry standards, considering weight and loading of each item.

D. Secure studs to top and bottom tracks by welding at both inside and outside flanges or with a minimum of 2-#8 self tapping screws (one per flange) up to 16 gage material and 2-#10 self tapping screws (one per flange) for 14 gage and thicker, unless noted otherwise.

E. Frame wall openings larger than 2 foot-0 inches square with double studs at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.

F. All components of build-up stud sections, including jack studs, full height studs, columns, headers, etc. shall be welded together with utilizing 1/8” fillet welds 1” long at 12” on center along the full height of each flange to flange connection unless noted otherwise.

G. Install horizontal bridging in stud system, spaced (vertical distance) at no more than 4 foot – 0 inches o.c. Weld at each intersection.

H. Touch-up shop-applied protective coatings damaged during handling and installation. Use compatible primer for prime coated surfaces; use galvanizing repair paint for galvanized surfaces, such as zinc-rich paint.

END OF SECTION 054000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rooftop equipment bases and support curbs.
2. Wood blocking , cants, and nailers.
3. Wood furring and grounds.
4. Wood sleepers.
5. Plywood backing panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

A. <Click to insert sustainable design text for manufacturer qualifications.>

B. <Click to insert sustainable design text for vendor qualifications.>

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. <Click to insert sustainable design text for regional materials.>

B. <Click to insert sustainable design text for certified wood.>

C. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber 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, [**or**] omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Dress lumber, S4S, unless otherwise indicated.

D. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.

E. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or 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.

D. Application: Treat all rough carpentry unless otherwise indicated.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
2. Eastern softwoods; No. 2 Common grade; NeLMA.

3. Northern species; No. 2 Common grade; NLGA.
4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C , fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall 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 A153/A153M .

B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.6 METAL FRAMING ANCHORS

A. <Click here to find, evaluate, and insert list of manufacturers and products.>

B. Allowable design loads, as published by manufacturer, shall meet or exceed those [**of products of manufacturers listed**]. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.7 MISCELLANEOUS MATERIALS

PART 3 - EXECUTION

3.1 INSTALLATION

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. 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.
3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough 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 - PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wall Sheathing.
2. Weather-Resistant Sheathing Barriers.

B. Related Sections include the following:

1. Section 018113 – Sustainable Design Requirements.
2. Section 054000 – Cold-Formed Metal Framing.
3. Section 061000 – Rough Carpentry.

1.2 REFERENCES

A. American Society for Testing and Materials:

1. ASTM C 297: Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
2. ASTM C 954: Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inch to 0.110 inch in Thickness
3. ASTM C 1002: Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
4. ASTM C 1177: Standard Specification for Glass Mat Gypsum – Substrate for use as Sheathing.
5. ASTM C 1280: Standard Specification for Application of Gypsum Sheathing.
6. ASTM C 1396: Standard Specification for Gypsum Board.
7. ASTM D 226: Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
8. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E 119: Test Method for Fire Tests of Building Construction and Materials.
10. ASTM E 1677: Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.

B. Gypsum Association:

1. GA 253: Recommended Specification for the Application of Gypsum Sheathing.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300

B. Product Data: Submit manufacturer's current technical literature for product specified.

1.4 QUALITY ASSURANCE

A. A. Fire Resistance Rated Assembly Characteristics: Provide materials and construction identical to those tested in accordance to ASTM E 119 by an independent testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire Resistance Ratings: Indicated by design designations from UL Fire Resistance Directory.

1.5 1.05 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. WARNING: Store all SECUROCK Brand Glass Mat Sheathing flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized.

PART 2 - PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass Mat Gypsum Sheathing: ASTM C 1177 gypsum sheathing.

1. Product: Subject to compliance with requirements, provide SECUROCK Brand Glass Mat Sheathing by United States Gypsum Company.
2. Type and Thickness: Type X, 5/8 inch thick.
3. Size: 48 by 96 inches with square edge.

2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and application.

B. Nails: 11-gauge hot-dipped galvanized roofing nails [**1-1/2 inch**] , 7/16 inch diameter head – (Minimum).

C. Wood Screws: # 6 1-5/8 inch with a corrosion-resistance of more than 800 hours per ASTM B117 (Minimum).

D. Screws for Fastening Sheathing to Cold-Formed Metal Framing: #6 1-5/8 inch with corrosion-resistance of more than 800 hours per ASTM B117 (Minimum).

1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C 954.

2.3 MISCELLANEOUS MATERIALS

A. Sealant For Glass Mat Gypsum Sheathing Board: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials.

B. Sealant for Glass-Mat Gypsum Sheathing Board: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing.

C. Sheathing Tape for Glass-Mat Gypsum Sheathing Board: Self –adhering, glass fiber tape, minimum 2” wide for use with silicone emulsion sealant in sealing joints in glassmat gypsum sheathing board.

D. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film.

E. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

PART 3 - 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.

B. Cut panels at penetrations, edges, and other obstructions of work; fit closely against abutting construction, unless otherwise indicated.

C. Coordinate wall 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.

D. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 SHEATHING INSTALLATION

A. Comply with ASTM C 1280, GA-253 and manufacturer's written instructions.

1. Fasten sheathing to cold-formed metal framing with screws.

2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. 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 boards but do not cut into facing.

C. Sheathing may be installed with the long dimension of the sheathing either parallel or perpendicular to framing. Board orientation to be dictated by performance requirements. Abut ends and/or edges of the boards centered over face of framing members. Offset board joints by not less than one stud spacing

1. Space fasteners a maximum of 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards. Adjust spacing of fasteners to meet specific fire or structural performance requirements.
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.

3.3 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturers written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over weather-resistant building paper at bottom and sides of openings.
4. Lap weather-resistant building paper over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION 061600

SECTION 064116 - PLASTIC-LAMINATE-CLAD 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 that are not concealed within other construction.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2.
3. Section 12366116 Solid Surfacing Countertops.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plastic-laminate-faced architectural cabinets.

1. Include plans, elevations, sections, and attachment details.
2. Show details.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
5. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or fabricator's standard size.

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches , for each type, color, pattern, and surface finish required.
   a. Provide one sample applied to core material with specified edge material applied to one edge.
2. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer .

B. Product Certificates: For the following:

1. Composite wood and agrifiber products.
2. Thermoset decorative panels.
3. High-pressure decorative laminate.
4. Adhesives.

C. Quality Standard Compliance Certificates: AWI Quality Certification Program .

1.6 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.

1. Shop Certification: AWI's Quality Certification Program accredited participant .

B. Installer Qualifications: AWI's Quality Certification Program accredited participant .

C. Manufacturer Qualifications: Laminate manufacturer producing products in an ISO 9001 certified facility.

D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups of typical architectural 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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 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 levels planned for building occupants 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 17 and 50 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/concealed by construction, 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.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET FABRICATORS

A. Fabricators: Subject to compliance with requirements, fabricators offering architectural cabinets that may be incorporated into the work include, or are equal to, those specified.

1. <**Insert, in separate subparagraphs, names and contact information for preapproved woodworking firms**>.

2.2 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.

1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.

B. Grade: Custom .

C. Regional Materials: Wood products shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

D. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.

E. Type of Construction: Frameless .

F. Door and Drawer-Front Style: Reveal overlay.

1. Reveal Dimension: 1/2 inch .

G. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Wilsonart LLC; Decorative Plastic Laminates or a comparable product by one of the following:
   a. Abet Laminati Inc.
   b. Formica Corporation.
   c. Lamin-Art, Inc.
   d. Pionite; a Panolam Industries International, Inc. brand.

H. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGL.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade HGS .
4. Edges: ABS/PVC extruded fabrication.
5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels .

I. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
2. Drawer Sides and Backs: Thermoset decorative panels with ABS/PVC extrusion edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

J. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

K. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: NEMA LD 3, Grade VGL thermoset decorative panels .

L. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners .

M. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated on Finish Legend in Drawings.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 4 to 9 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

2.4 FIRE-RETARDANT-TREATED MATERIALS

2.5 CABINET HARDWARE AND ACCESSORIES

A. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening , self-closing.

B. Back-Mounted Pulls: BHMA A156.9, B02011.

C. Catches: Magnetic catches, BHMA A156.9, B03141 .

D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081 .

E. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

F. 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 not more than 3 inches high and not more than 24 inches wide, provide [**Grade 1**].
3. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1 .
4. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100 .

G. Door Locks: BHMA A156.11, E07121.

H. Drawer Locks: BHMA A156.11, E07041.

I. Door and Drawer Silencers: BHMA A156.16, L03011.

J. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear) , Quality-Q3, 6 mm thick unless otherwise indicated.

1. Unframed Glass Doors: Seam exposed edges seamed before tempering.

K. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 2 or 3 (tinted), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.

1. Tint Color: Gray .

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber , kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide 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: Use adhesives that meet 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. Adhesive for Bonding Plastic Laminate: Contact cement .

1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.7 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. 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 architectural cabinet 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.

C. 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. For decorative plastic laminates, comply with manufacturer's written fabrication instructions.

D. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual."

1. For glass in frames, secure glass with removable stops.
2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with quality standard grade of item to be installed.

B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install cabinets without distortion so doors and drawers fit openings 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.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish .

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 architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces. Clean decorative plastic laminate surfaces according to manufacturer's written care and maintenance instructions.

D. Protect completed work from damage for duration of construction period.

3.4 SCHEDULE

END OF SECTION 064116

SECTION 072600 - UNDER-SLAB VAPOR RETARDER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products Supplied Under This Section

B. Vapor Retarder, seam tape, mastic, pipe boots for installation under concrete slabs.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-place Concrete

B. Section 03 20 00 - Concrete Forming and Accessories

C. Section 31 23 11 - Earthwork for Building Construction

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM), latest versions:

1. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials
2. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
3. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
4. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

B. American Concrete Institute (ACI), latest versions:

1. ACI 302.2R - Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials

1.4 SUBMITTALS

A. Quality Control / Assurance

1. Comply with Section 01 33 00 – Submittal Procedures.
2. Independent laboratory test results showing compliance with ASTM & ACI Standards.
3. Manufacturer’s samples, literature
4. Manufacturer’s installation instructions for placement, seaming and pipe boot installation

B. Delivery, Storage, and Handling

1. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
2. Store materials in a clean dry area in accordance with manufacturer's instructions.
3. Stack membrane on smooth ground or wood platform to eliminate warping.
4. Protect materials during handling and application to prevent damage or contamination.
5. Ensure membrane is stamped with manufacturer’s name, product name and membrane thickness at intervals of no more than 85” (220 cm).

C. Environmental requirements

1. Product not intended for uses subject to abuse or permanent exposure to the elements.
2. Do not apply on frozen ground.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor Retarder (Performance-Based Specifications)

1. Vapor Retarder must have the following qualities at minimum and meet floor finish manufacturer’s warranty requirements.

    a. Water Vapor Retarder ASTM E1745: Meets or exceeds Class A

    b. Maximum Permeance ASTM E96: 0.01 Perms or as required to meet Flooring Manufacturer’s Warranties.

    c. Tensile Strength ASTM E154, Section 9: not less than 45 LBS. Force/Inch

    d. Puncture Resistance, ASTM D1709, Method B.

    e. Thickness of Retarder (plastic) ACI 302.1R: Not less than 15 mils

    f. Material: Virgin Polyethylene or Polyolefin
2. Vapor Retarder Products, may be by one of the following manufacturers or an approved equal, as long as the requirements above are met.

    a. Epro, http://eproserv.com

    b. Fortifiber, http://www.fortifiber.com

    c. Stego Industries, http://www.stegoindustries.com

    d. W.R. Meadows, http://www.wrmeadows.com

    e. Raven Industries, http://www.vaporblock.com

    f. Reef Industries, http://www.reefindustries.com

    g. Insulation Solutions, http://www.insulationsolution.com

2.2 ACCESSORIES

A. Seam Tape

1. Tape must have the following qualities:

a. Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower

B. Vapor Proofing Mastic

1. Mastic must have the following qualities:

a. Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower

C. Pipe Boots

1. Construct pipe boots from vapor Retarder material, pressure sensitive tape and/or mastic per manufacturer’s instructions.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive membrane. Ensure compaction requirements have been completed and geotechnical firm has confirmed compaction requirements have been met. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.2 SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturers instructions.

3.3 INSTALLATION

A. Install Vapor Retarder:

1. Installation shall be in accordance with manufacturer’s instructions and ASTM E 1643.

a. Unroll Vapor Retarder with the longest dimension parallel with the direction of the pour.

b. Lap Vapor Retarder over footings and seal to foundation walls.

c. Overlap joints 6 inches and seal with manufacturer’s tape.

d. Seal all penetrations (including pipes) per manufacturer’s instructions.

e. No penetration of the Vapor Retarder is allowed except for reinforcing steel and permanent utilities.

f. Repair damaged areas by cutting patches of Vapor Retarder, overlapping damaged area 6 inches and taping all four sides with tape.

END OF SECTION 072600

SECTION 074213.19 - INSULATED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foamed-insulation-core metal wall panels.
2. Laminated-insulation-core metal wall panels.

1.2 PREINSTALLATION MEETINGS

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 for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication, installation sequence, and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details for weathertight installation.
2. Coordination Drawings: Provide elevation drawings and building sections, which indicate panels in relationship to required locations for structural support. Include panel details and details showing attachment to structural support.
3. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
4. Panel Analysis: Provide panel calculations to verify that panels withstand design wind loads indicated without detrimental effects or deflection exceeding L/180. Include effects of thermal differential between exterior and interior panel facings and resistance to fastener pullout.

C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below.

1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: 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.
2. Installer: A manufacturer authorized entity that employs experienced installers and supervisors.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.8 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including rupturing, cracking, or puncturing.
   b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: Two <**Insert number**> years from date of Substantial Completion or starting six months from date of shipment and issued to Owner on date of Substantial Completion, whichever occurs first.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested in accordance with ASTM D2244.
   b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 <**Insert number**> years from date of Substantial Completion or starting six months from date of shipment and issued to Owner date of Substantial Completion, whichever occurs first.

C. Thermal Warranty: Standard form in which manufacturer agrees to repair or replace panels that exhibit greater than 10 percent reduction from published material R-value at time of manufacture as measured in accordance with ASTM C518 within specified warranty period.

1. Warranty Period: 30 years from date of Substantial Completion or starting three months from date of shipment and issued to Owner date of Substantial Completion, whichever occurs first.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E72 and ASTM E330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings <**Insert loads**>.
3. Deflection Limits: For wind loads, no greater than 1/180 <**Insert deflection**> of the span.
4. <**Insert serviceability requirements**>.

B. FM Approval 4881: Wall panel windborne debris rating with large missile impact.

1. Non-Tropical Cyclone (NTC) Zone H; Class [**+40/-40**] [**+75/-75**].
2. Tropical Cyclone (TC) Zone H; Class +45/-45.
3. Tropical Cyclone Missile (TCM) Zone HM-LM: Class +60/-60.

C. Freeze/Heat Cycling Test: Panels shall not exhibit delamination, surface blisters, permanent bowing, or deformation when subjected to cyclic temperature extremes of minus 36 to plus 180 deg F for 21, eight-hour cycles.

D. Air Infiltration: Air leakage of not more than when tested in accordance with ASTM E283 at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft. .

E. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 2.86 lbf/sq. ft. .

F. Water Penetration under Dynamic Pressure: No uncontrolled water penetration through panel assembly when tested in accordance with AAMA 501.1 at the following test-pressure difference:

1. Test-Pressure Difference: 15 lbf/sq. ft..

G. Humidity Test: Panels shall exhibit no delamination or metal interface corrosion at 140 deg F and 100 percent relative humidity for 1200 hours (50 days).

H. Autoclave Test: Panels shall exhibit no delamination or shrinkage/melting of foam core from metal skins at 218 deg F in an autoclave for 150 minutes (2-1/2 hours).

I. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental

effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F , ambient; 180 deg F , material surfaces <**Insert temperature range**>.

J. Fire-Test-Response Characteristics: Provide metal wall panels and system components with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E119.
2. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which wall panel is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies.
3. UL 263 Fire-Rated Wall Assembly Fire Test: [**1] [2**] [**3**]-hour fire-rated assembly component of UL Design No. U053 [**(rated assemblies include appropriate layers of fire-rated Type X gypsum board)**].
4. Potential Heat: Acceptable level when tested in accordance with NFPA 259.
5. Surface-Burning Characteristics: Provide wall panels with a flame-spread index of 25 or less and a smoke-developed index of 450 or less, per ASTM E84.
6. FM Approval 4880: Class I fire rating; panel approved for use without thermal barriers and does not create requirement for automatic sprinkler protection.
7. FM Approval 4882: Class I low smoke rating.
8. Ignition Temperature: Foam core minimum 820 deg F flash temperature and minimum 1050 deg F self-ignition temperature as tested in accordance with ASTM D1929.
9. UL Canada Fire Tests: Pass; fire tests S101, S102, S127, and S134.

2.2 FOAMED-INSULATION-CORE METAL WALL PANELS

A. General: Provide factory-formed and -assembled metal wall panels fabricated from two metal facing sheets and insulation core foamed in place during fabrication, and with joints between panels designed to form weathertight seals. Include accessories required for weathertight installation.

1. Insulation Core: ASTM C591, Type IV, modified polyisocyanurate foamed-in-place core using a non-CFC, [**and**]non-HCFC [**, and nonhalogenated (halogenated-flame-retardant-free)**] blowing agent, compliant with Montreal Protocol and Clean Air Act, with the following minimum physical properties:
   a. Closed-Cell Content: 90 percent when tested in accordance with ASTM D6226.
   b. Density: 2.2 to 2.8 lb/cu. ft. when tested in accordance with ASTM D1622.
   c. Compressive Strength: Minimum 24 psi when tested in accordance with ASTM D1621.
   d. Shear Strength: 17 psi when tested in accordance with ASTM C273/C273M.

e. Tensile Stress: 19 psi in accordance with ASTM D1623.
f. Oven Aging at 212 deg F: Tested in accordance with ASTM D2126.
   1) Volume Change over One Day: Minus 0.63 percent.
   2) Volume Change over Seven Days: Plus 0.43 percent.
g. Low Temperature Aging at minus 40 deg F: Tested in accordance with ASTM D2126.
   1) Volume Change over One Day: Plus 0.16 percent.
   2) Volume Change over Seven Days: Minus 0.60 percent.

B. Concealed-Fastener, High-Performance Foamed-Insulation-Core Metal Wall Panels <**Insert drawing designation**>: Formed with tongue-and-groove panel edges; designed for sequential installation by interlocking panel edges and mechanically attaching panels to supports using concealed clips or fasteners.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Kingspan Insulated Panels; KS Azteco KS Micro-Rib or comparable product by one of the following:
   a. BENCHMARK by Kingspan.
   b. Green Span Profiles.
   c. FALK Panel.
   d. <**Insert manufacturer's name**>.
2. Metallic-Coated Steel Sheet: Facings of zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
   a. Nominal Thickness: 0.022 inch , 26 gauge .
   b. Exterior Finish: Mica fluoropolymer .
      1) Profile: Flat Micro-Rib .
      2) Embossing: Azteco .
      3) Color: As selected by Architect from manufacturer's full range <**Insert color**>.
3. Panel Coverage: As indicated on drawings nominal.
4. Panel Thickness: 4.0 inches .
5. Thermal-Resistance Value (R-Value): 8.0 deg F x h x sq. ft./Btu per inch at 75 deg F mean temperature and 9.0 deg F x h x sq. ft./Btu per inch at 35 deg F mean temperature in accordance with ASTM C518.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Backer Board: Hardboard complying with ANSI A135.4, Class 1 tempered, [**1/8 inch**] [**1/4 inch**] thick unless otherwise indicated.

D. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

E. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. 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 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.

C. Steel Panels and Accessories:

1. Mica Fluoropolymer: AAMA 621. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
    a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with ASTM C754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

A. General: Install metal panels in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
2. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

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

1. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.4 INSULATED METAL WALL PANEL INSTALLATION

A. General: Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal wall panels as vapor seal; apply sealant to panel joint on exposed side of panels for weather seal.

1. Fasten foamed-insulation-core metal wall panels to supports with fasteners at each lapped joint at location and spacing and with fasteners recommended by manufacturer.
2. Apply panels and associated items true to line for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
3. Provide metal-backed washers under heads of exposed fasteners on weather side of insulated metal wall panels.
4. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
5. Provide sealant tape at lapped joints of insulated metal wall panels and between panels and protruding equipment, vents, and accessories.
6. Apply a continuous ribbon of sealant tape to panel side laps and elsewhere as needed to make panels weathertight.

B. Foamed-Insulation-Core Metal Wall Panels: Fasten metal wall panels to supports with concealed clips at each joint at location and spacing and with fasteners recommended by manufacturer. Fully engage tongue and groove of adjacent panels.

1. Install clips to supports with self-tapping fasteners.

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

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

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

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Water-Spray Test: After installation, test area of assembly as directed by Architect <**Insert area**> for water penetration in accordance with AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

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

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

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

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

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

END OF SECTION 074213.19

SECTION 075423 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Substrate board.
3. Roof insulation.
4. Cover board.
5. Walkways.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
5. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
6. Tie-in with adjoining air barrier.

C. Samples: For the following products:

1. Roof membrane and flashings, of color required.
2. Walkway pads or rolls, of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   a. Submit evidence of compliance with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: [**30**] years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): <**Insert** lbf/sq. ft.>.
2. Zone 2 (Roof Area Perimeter): <**Insert** lbf/sq. ft.>.
   a. Location: From roof edge to <**Insert dimension**> inside roof edge.
3. Zone 3 (Roof Area Corners): <**Insert** lbf/sq. ft.>.
   a. Location: <**Insert dimension**> in each direction from building corner.

D. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low -slope roof products.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced, TPO sheet.

1. Manufacturers: Subject to compliance with requirements, undefined:
   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products.
   c. Johns Manville; a Berkshire Hathaway company.
2. Thickness: 80 mils , nominal.
3. Exposed Face Color: [**White**] .

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 80 mils thick, minimum, of same color as TPO sheet.

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Bonding Adhesive: Manufacturer's standard.

E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 SUBSTRATE BOARDS

A. Substrate Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M, fiber-reinforced gypsum board.

1. Manufacturers: Subject to compliance with requirements, undefined:
   a. Georgia-Pacific Gypsum LLC.
   b. National Gypsum Company.

c. USG Corporation.
2. Thickness: [**1/2 inch**] thick.
3. Surface Finish: Unprimed.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 ROOF INSULATION

A. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2 , felt or glass-fiber mat facer on both major surfaces.

1. Manufacturers: Subject to compliance with requirements, undefined:
   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products.
   c. Johns Manville; a Berkshire Hathaway company.
2. Size: 48 by 48 inches .
3. Thickness:
   a. Base Layer: 1-1/2 inches .
   b. Upper Layer: 4 inches .

2.6 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

B. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M fiber-reinforced gypsum board.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Georgia-Pacific Gypsum LLC.
   b. National Gypsum Company.
   c. USG Corporation.
2. Thickness: 1/4 inch .
3. Surface Finish: Unprimed.

2.7 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.

1. Size: Approximately 36 by 60 inches.
2. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

3.2 PREPARATION

A. Perform fastener-pullout tests according to roof system manufacturer's written instructions.

1. Submit test result within 24 hours after performing tests.
    a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

C. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Section 072726 "Fluid-Applied Membrane Air Barriers."

3.4 INSTALLATION OF SUBSTRATE BOARD

A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.

1. At steel roof decks, install substrate board at right angle to flutes of deck.
    a. Locate end joints over crests of steel roof deck.
2. Tightly butt substrate boards together.
3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29.

3.5 INSTALLATION OF INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows .
    a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
    b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
        1) Trim insulation so that water flow is unrestricted.
    e. Fill gaps exceeding 1/4 inch with insulation.
    f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
    g. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
        1) Fasten insulation according to requirements in [**FM Approvals' RoofNav for specified Windstorm Resistance Classification**] .
        2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
    a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
    b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
        1) Trim insulation so that water flow is unrestricted.
    e. Fill gaps exceeding 1/4 inch with insulation.
    f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
    g. Adhere each layer of insulation to substrate using adhesive according to [**FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification**] and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.
   a. Trim cover board so that water flow is unrestricted.
3. Cut and fit cover board tight to nailers, projections, and penetrations.
4. Adhere cover board to substrate using adhesive according to [**FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification**] and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
   a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 INSTALLATION OF ADHERED ROOF MEMBRANE

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

F. Apply roof membrane with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.8 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 INSTALLATION OF WALKWAYS

A. Flexible Walkways:

1. Install flexible walkways at the following locations:
    a. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
    b. Locations indicated on Drawings.
    c. As required by roof membrane manufacturer's warranty requirements.
2. Provide 6-inch clearance between adjoining pads.
3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

1.1 QUALITY ASSURANCE

A. Mockups of typical roof edge built-in gutter <**Insert item**>.

1.2 PERFORMANCE REQUIREMENTS

A. Sheet Metal Standard for Flashing and Trim: NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" <**Insert standard**>.

B. FM Approvals Listing: For copings roof edge flashings for windstorm classification, Class 1-60 Class 1-75 <**Insert class**>.

C. SPRI Wind Design Standard: For copings roof edge flashings according to ANSI/SPRI/FM 4435/ES-1 for design pressure of <**Insert design pressure**>:

1.3 MATERIALS

A. Sheet Metals:

1. Aluminum Sheet: Two-coat fluoropolymer .
2. Zinc-tin alloy-coated copper sheet.
3. Metallic-Coated Steel Sheet:
    a. Mill phosphatized.
    b. Coil-Coated Finish: Two-coat fluoropolymer .

B. Underlayment: Felts .

1.4 PRODUCTS

A. Manufactured reglets with counterflashing.

B. Formed Roof-Drainage Fabrications: Including hanging gutters built-in gutters downspouts .

C. Formed Low-Slope Roof Fabrications: Including [**copings**] roof expansion-joint covers base flashing counterflashing flashing receivers roof-penetration flashing and roof-drain flashing.

D. Formed Wall Fabrications: Including opening flashings in frame construction and wall expansion-joint cover.

E. Miscellaneous Formed Fabrications: Including equipment support flashing and overhead-piping safety pans.

END OF SECTION 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copings.
2. Reglets and counterflashings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of roof specialty and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are [**FM Approvals listed for specified class**] [**and**] [**SPRI ES-1 tested to specified design pressure**].

1.6 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 075400 " Thermoplastic Polyolefin (TPO) Membrane Roofing ."

B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Delta E units when tested according to ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FM Approvals' Listing: Manufacture and install copings roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-75 . Identify materials with FM Approvals' markings.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F , ambient; 180 deg F , material surfaces.

2.2 COPINGS

A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet , concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.

1. Manufacturers: Subject to compliance with requirements, undefined:
   a. Architectural Products Company.
   b. ATAS International, Inc.
   c. Berridge Manufacturing Company.
   d. Metal-Era, Inc.
   e. PAC-CLAD; Petersen Aluminum Corporation.
2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, thickness as required to meet performance requirements .
   a. Surface: Smooth, flat finish.
   b. Finish: Two-coat fluoropolymer .
   c. Color: As selected by Architect from manufacturer's full range .
3. Corners: Factory mitered and continuously welded .
4. Coping-Cap Attachment Method: Snap-on or , fabricated from coping-cap material.
   a. Snap-on Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.

2.3 REGLETS AND COUNTERFLASHINGS

A. Manufacturers: Subject to compliance with requirements, undefined:

1. Berridge Manufacturing Company.
2. Keystone Flashing Company, Inc.
3. Metal-Era, Inc.

B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:

1. Formed Aluminum: [**0.050 inch**] thick.
2. Corners: Factory mitered and soldered .
3. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches and in lengths not exceeding 12 feet designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:

1. Formed Aluminum: 0.024 inch thick.

D. Accessories:

1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

E. Aluminum Finish: Clear anodic .

2.4 MATERIALS

A. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

2.5 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. 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. Carlisle WIP Products; a brand of Carlisle Construction Materials.

b. Henry Company.
c. Owens Corning.

2. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F.
3. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F.

2.6 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

B. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

C. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

E. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.7 FINISHES

A. Coil-Coated Aluminum Sheet Finishes:

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6

inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

3.2 INSTALLATION, GENERAL

A. Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of [**uncoated aluminum**] roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws .

E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of

uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 INSTALLATION OF COPING

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements .

3.4 INSTALLATION OF REGLETS AND COUNTERFLASHINGS

A. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

B. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with butyl sealant. Fit counterflashings tightly to base flashings.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed.

END OF SECTION 077100

SECTION 077129 - MANUFACTURED ROOF EXPANSION JOINTS

1.1 WARRANTY

A. Materials and Workmanship: Two <**Insert number**> years.

B. Painted Finishes: 20 <**Insert number**> years.

1.2 SUSTAINABILITY REQUIREMENTS

1.3 PRODUCTS

A. Flanged Bellows-Type Roof Expansion Joint:

1. Joint Movement Capability: Plus and minus 50 percent of joint size <**Insert dimension or percentage**>.
2. Bellows Membrane: PVC <**Insert material**>.
3. Flanges: Galvanized steel Non-metallic PVC membrane <**Insert requirement**>.
4. Corner, Intersection, and Transition Units: Factory fabricated.
5. Cover Membrane: PVC <**Insert material**> covering entire joint assembly and curbs.
6. Secondary seal with drain-tube assembly <**Insert requirement**>.
7. Fire Barrier:
   a. Fire-Resistance Rating: Matching rating of roof assembly <**Insert rating**>.

B. Extruded Bellows Roof Expansion Joint:

1. Joint Movement Capability: Plus and minus 25 percent of joint size 50 percent of joint size <**Insert dimension or percentage**>.
2. Primary Seal: Silicone extrusion.
3. Secondary seal with drain-tube assembly.
4. Corner, Intersection, and Transition Units: Factory fabricated.

END OF SECTION 077129

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof curbs.
2. Roof hatches.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.

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. AES Industries, Inc.
b. Curbs Plus, Inc.
c. Kingspan Light + Air, North America.
d. LMCurbs.
e. Roof Curb Systems.
f. Roof Products and Systems (RPS); a division of Hart & Cooley, Inc.
g. Thybar Corporation.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Material: Zinc-coated (galvanized) steel sheet, 0.052 inch thick.

1. Finish: Factory prime coating .
2. Color: As selected by Architect from manufacturer's full range .

D. Construction:

1. Curb Profile: Manufacturer's standard compatible with roofing system.
2. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
3. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
4. Top Surface: Level top of curb, with roof slope accommodated by sloping deck-mounting flange .
5. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.
6. Insulation: Factory insulated with 1-1/2-inch- thick glass-fiber board insulation.
7. Liner: Same material as curb, of manufacturer's standard thickness and finish.
8. Nailer: Factory-installed wood nailer along top flange of curb , continuous around curb perimeter.

2.2 ROOF HATCHES

A. Roof Hatches: Metal roof-hatch units with lids and insulated single -walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom.

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. Babcock-Davis.
   b. Dur-Red Products.
   c. Kingspan Light + Air LLC.
   d. Nystrom, Inc.
   e. O'Keeffe's Inc.
   f. Precision Ladders, LLC.

2. Type and Size: Single-leaf lid, 30 by 54 inches <**Insert dimensions**>.
3. Loads: Minimum [**40-lbf/sq. ft.**] <**Insert value**> external live load and [**30-lbf/sq. ft.**] <**Insert value**> internal uplift load.
    a. When release is actuated, lid shall open against [**10-lbf/sq. ft.**] <**Insert value**> snow or wind load and lock in position.
4. Curb, Framing, and Lid Material: Aluminum-zinc alloy-coated steel sheet.
    a. Thickness: Manufacturer's standard thickness for hatch size indicated <**Insert dimension**>.
    b. Finish: Two-coat fluoropolymer <**Insert finish**>.
    c. Color: As selected by Architect from manufacturer's full range <**Insert color**>.
5. Construction:
    a. Insulation: 2-inch- thick, polyisocyanurate board.
        1) R-Value: 12.0 <**Insert R-value**> according to ASTM C1363.
    b. Nailer: Factory-installed wood nailer continuous around hatch perimeter.
    c. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
    d. Exterior Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
    e. Fabricate curbs to minimum height of [**12 inches**] <**Insert dimension**> above roofing surface unless otherwise indicated.
    f. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.
    g. Security Grille: Provide for all units .
6. Hardware: Manufacturer's standard corrosion resistant ; with hinges, hold-open devices, and independent manual-release devices for inside and outside operation of lids.

2.3 METAL MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 coating designation and mill phosphatized for field painting where indicated.

1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.

B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, AZ50 coated.

1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.

C. Aluminum Sheet: ASTM B209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.

1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.

D. Aluminum Extrusions and Tubes: ASTM B221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.

E. Stainless Steel Sheet and Shapes: ASTM A240/A240M or ASTM A666, Type 304.

F. Steel Shapes: ASTM A36/A36M, hot-dip galvanized according to ASTM A123/A123M unless otherwise indicated.

G. Steel Tube: ASTM A500/A500M, round tube.

H. Galvanized-Steel Tube: ASTM A500/A500M, round tube, hot-dip galvanized according to ASTM A123/A123M.

I. Steel Pipe: ASTM A53/A53M, galvanized.

2.4 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Acrylic Glazing: ASTM D4802, thermoformable, monolithic sheet, manufacturer's standard, Type UVA (formulated with UV absorber), Finish 1 (smooth or polished).

C. Polycarbonate Glazing: Thermoformable, monolithic polycarbonate sheets manufactured by extrusion process, burglar-resistance rated according to UL 972 with an average impact strength of 12 to 16 ft-lbf/in. of width when tested according to ASTM D256, Method A (Izod).

D. Cellulosic-Fiber Board Insulation: ASTM C208, Type II, Grade 1, thickness as indicated.

E. Glass-Fiber Board Insulation: ASTM C726, nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F, thickness as indicated.

F. Polyisocyanurate Board Insulation: ASTM C1289, thickness and thermal resistivity as indicated.

G. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.

H. Underlayment:

1. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
2. Polyethylene Sheet: 6-mil- thick polyethylene sheet complying with ASTM D4397.

3. Slip Sheet: Building paper, 3 lb/100 sq. ft. minimum, rosin sized.

I. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

J. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

K. Elastomeric Sealant: ASTM C920, elastomeric polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

L. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

M. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify dimensions of roof openings for roof accessories. Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.

C. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.2 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A780/A780M.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 079100 - PREFORMED JOINT SEALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes preformed, foam joint seals.

1.2 ACTION SUBMITTALS

A. Product Data: For each preformed joint seal product.

B. Samples for Verification: For each type and color of preformed joint seal required.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranties.

1.4 WARRANTY

A. Special Warranty: Installer agrees to repair or replace preformed joint seals that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: [**Two**] <**Insert number**> years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish preformed joint seals 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**] <**Insert number**> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PREFORMED, FOAM JOINT SEALS

A. Preformed, Foam Joint Seals <**Insert drawing designation**>: Manufacturer's standard joint seal manufactured from urethane or EVA (ethylene vinyl acetate) foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths

based on design criteria indicated, with factory- or field-applied adhesive for bonding to substrates.

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. EMSEAL Joint Systems, Ltd.
   b. LymTal International, Inc.
   c. MM Systems Corporation.
   d. Nystrom, Inc.
   e. Pecora Corporation.
   f. Willseal; Tremco Construction Products Group.
2. Design Criteria:
   a. Nominal Joint Width: [**As indicated on Drawings**] <**Insert dimension**>.
   b. Movement Capability: [**As indicated on Drawings**] [**-25 percent/+25 percent**] <**Insert percentage**>.
3. Joint Seal Color: As selected by Architect from full range of industry colors .

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing preformed joint seals to comply with preformed joint seal manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.
2. 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.

B. Joint Priming: Prime joint substrates where recommended by preformed joint seal manufacturer or as indicated by tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of adhesive or primer with adjoining surfaces.

3.2 INSTALLATION

A. General: Comply with preformed joint seal manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Installation of Preformed, Foam Joint Seals:

1. Install each length of seal immediately after removing protective wrapping.

2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.
3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.
4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.

END OF SECTION 079100

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.

1.2 PREINSTALLATION MEETINGS

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples: For each kind and color of joint sealant required.

C. 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 test reports.

B. Field-adhesion-test reports.

C. Sample warranties.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

1.7 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: [**Two**] <**Insert number**> years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: [**Five**] <**Insert number**> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Colors of Exposed Joint Sealants: [**As indicated by manufacturer's designations**] [**Match Architect's samples**] [**As selected by Architect from manufacturer's full range**].

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T and NT.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

2.3 URETHANE JOINT SEALANTS

A. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Uses T and NT.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

2.4 JOINT-SEALANT BACKING

A. 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.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

PART 3 - EXECUTION

3.1 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 laitance and form-release agents from concrete.
2. 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.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. 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.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. 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.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
   a. Perform [**10**] <**Insert number**> tests for the first [**1000 feet**] <**Insert dimension**> of joint length for each kind of sealant and joint substrate.
   b. Perform one test for each [**1000 feet**] <**Insert dimension**> of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. 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.

3.4 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces [**<JS-#>**].

1. Joint Locations:
   a. Isolation and contraction joints in cast-in-place concrete slabs.
   b. .
2. Joint Sealant: Urethane, M, P, 50, T, NT <**Insert joint sealant**>.
3. Joint-Sealant Color: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range of colors**] <**Insert color**>.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces [**<JS-#>**].

1. Joint Locations:
   a. Construction joints in cast-in-place concrete.
   b. .
2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT <**Insert joint sealant**>.
3. Joint-Sealant Color: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range of colors**] <**Insert color**>.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces [**<JS-#>**].

1. Joint Locations:
   a. Isolation joints in cast-in-place concrete slabs.
   b. .
2. Joint Sealant: Urethane, S, P, 25, T, NT <**Insert joint sealant**>.
3. Joint-Sealant Color: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range of colors**] <**Insert color**>.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement [**<JS-#>**].

1. Joint Locations:
   a. Perimeter joints between interior wall surfaces and frames of [**interior doors**] [**windows**] [**and**] [**elevator entrances**].
   b. .
2. Joint Sealant: <**Insert joint sealant**>.
3. Joint-Sealant Color: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range of colors**] <**Insert color**>.

END OF SECTION 079200

SECTION 079513.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

1.1 FLOOR EXPANSION JOINT COVERS

A. Metal-plate floor joint cover.

1.2 WALL EXPANSION JOINT COVERS

A. Metal-plate wall joint cover.

1.3 CEILING EXPANSION JOINT COVERS

A. Metal-plate ceiling joint cover.

1.4 ACCESSORIES

A. Moisture barriers.

END OF SECTION 079513.13

SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

1.1 EXTERIOR EXPANSION JOINT COVERS

A. Exterior metal-plate joint cover.

1.2 ACCESSORIES

A. Moisture barriers.

END OF SECTION 079513.16

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

1.1 SUSTAINABILITY REQUIREMENTS

A. [**ASHRAE 189.1**] Green Globes:

1. Recycled content.

1.2 PERFORMANCE REQUIREMENTS

A. Fire-rated assemblies.

B. Windborne-debris-impact-resistant doors and frames.

1.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1.

1. Thickness: 1-3/8 inches.
2. Face: Uncoated steel sheet, minimum thickness of 0.032 inch.
3. Edge Construction: [**Model 1, Full Flush**] .
4. Core: [**Manufacturer's standard**] .
5. Frames: [**Slip-on drywall**] ; uncoated steel sheet, minimum thickness of 0.042 inch.
6. Exposed Finish: [**Factory**].

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2.

1. Face: Uncoated steel sheet, minimum thickness of 0.042 inch.
2. Edge Construction: [**Model 1, Full Flush**] .
3. Core: [**Manufacturer's standard**] .
4. Frames: Slip-on drywall ; uncoated steel sheet, minimum thickness of 0.053 inch.
5. Exposed Finish: [**Factory**].

C. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3.

1. Face: Uncoated steel sheet, minimum thickness of 0.053 inch.
2. Edge Construction: [**Model 1, Full Flush**] .
3. Core: [**Manufacturer's standard**] .
4. Frames: ; uncoated steel sheet, minimum thickness of 0.053 inch.
5. Exposed Finish: [**Factory**].

D. Maximum-Duty Doors and Frames: ANSI/SDI A250.8, Level 4.

1. Face: Uncoated steel sheet, minimum thickness of 0.067 inch.
2. Edge Construction: [**Model 1, Full Flush**] .
3. Core: [**Manufacturer's standard**] .
4. Frames: ; uncoated steel sheet, minimum thickness of 0.067 inch.

5. Exposed Finish: [**Factory**].

1.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2.

1. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch.
2. Edge Construction: Model 2, Seamless.
3. Core: [**Manufacturer's standard**] .
4. Frames [**Full profile welded**]; metallic-coated steel sheet, minimum thickness of 0.053 inch.
5. Exposed Finish: [**Factory**].

B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3.

1. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
2. Edge Construction: Model 2, Seamless .
3. Core: [**Manufacturer's standard**] .
4. Frames [**Full profile welded**]; metallic-coated steel sheet, minimum thickness of 0.053 inch.
5. Exposed Finish: [**Factory**].

C. Maximum-Duty Doors and Frames: ANSI/SDI A250.8, Level 4.

1. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch.
2. Edge Construction: Model 2, Seamless.
3. Core: [**Manufacturer's standard**] .
4. Frames [**Full profile welded**]; metallic-coated steel sheet, minimum thickness of 0.067 inch.
5. Exposed Finish: [**Factory**].

1.5 INTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES

A. Hollow-Metal Doors and Frames: NAAMM-HMMA 860.

1. Face: [**Uncoated**] steel sheet; minimum thickness of [**0.032 inch**] .
2. Edge Construction: [**Continuously welded with no**] visible seam.
3. Core: Vertical steel stiffener.
4. Frames: [**Slip-on drywall**] ; uncoated steel sheet, minimum thickness of 0.053 inch.

B. Commercial Doors and Frames: NAAMM-HMMA 861.

1. Face: [**Uncoated**] steel sheet; minimum thickness of 0.042 inch.
2. Edge Construction: Continuously welded with no visible seam.
3. Core: Vertical steel stiffener.
4. Frames: [**Face**] [**Full profile**] welded; [**uncoated**] [**metallic-coated**] steel sheet, minimum thickness of 0.053 inch, except 0.067 inch for openings exceeding 4 feet wide.

C. Commercial Laminated Doors and Frames: NAAMM-HMMA 867.

1. Face: [**Uncoated**] steel sheet; minimum thickness of [**0.032 inch**] .
2. Edge Construction: [**Continuously welded with no visible seam**] .
3. Frames: [**Slip-on drywall**] ; 0.053-inch thickness.
4. Exposed Finish: [**Prime**] .
5. Core: [**Kraft-paper honeycomb**] .

1.6 EXTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES

A. Commercial Doors and Frames: NAAMM-HMMA 861.

1. Face: Metallic-coated steel sheet; minimum thickness of 0.042 inch.
2. Edge Construction: Continuously welded with no visible seam.
3. Core: Vertical steel stiffener.
4. Frames: [**Full profile**] welded; metallic-coated steel sheet, minimum thickness of 0.053 inch, except 0.067 inch for openings exceeding 4 feet wide.

B. Commercial Laminated Doors and Frames: NAAMM-HMMA 867.

1. Face Thickness: Metallic-coated steel sheet; minimum thickness of [**0.032 inch**] .
2. Edge Construction: [**Continuously welded with no visible seam**] .
3. Frames: [**Slip-on drywall**] ; 0.053-inch thickness.
4. Exposed Finish: [**Prime**] .
5. Core: [**Kraft-paper honeycomb**] .

1.7 ACCESSORIES

A. Louvers: , steel.

B. Mullions and transom bars.

C. Terminated (hospital) stops.

1.8 INSTALLATION

A. Metal-Stud Partitions and Concrete Walls: Frames filled with insulation.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

1.1 SUSTAINABILITY REQUIREMENTS

A. [**ASHRAE 189.1**] :

1. Regional materials.
2. Certified wood.
3. Low-emitting adhesives.
4. Low-emitting paints and coatings.
5. Low-emitting composite wood products.

1.2 QUALITY ASSURANCE

A. Manufacturer and Vendor: FSC certified for chain of custody.

B. Manufacturer: Licensed participant in [**AWI's Quality Certification Program**] .

1.3 DOOR CONSTRUCTION, GENERAL

A. Quality Standard: Architectural Woodwork Standards ANSI/WDMA I.S.1-A.

1. [**AWI Quality Certification**] Labels.
2. Registered with AWI as AWI Quality Certification Program.

1.4 FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Exterior Solid-Core Doors <**Insert drawing designation**>:

1. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Species: [**Select white maple**] <**Insert species**>.
4. Cut: [**Rotary cut**] [**Plain sliced (flat sliced)**] .
5. Match between Veneer Leaves: [**Pleasing**] match.
6. Assembly of Veneer Leaves on Door Faces: [**Center-balance**] match.
7. Pair and set match.
8. Core: [**Particleboard**] .
9. Construction: [**Five or seven**] plies, bonded.

B. Interior Solid-Core Doors <**Insert drawing designation**>:

1. Performance Grade: ANSI/WDMA I.S. 1A [**Heavy**] Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Species: Select white ash <**Insert species**>.
4. Cut: [**Rotary cut**] .
5. Match between Veneer Leaves: [**Pleasing**] match.
6. Assembly of Veneer Leaves on Door Faces: [**Center-balance**] match.

7. Special Matching:
   a. Pair and set match.
   b. Room Match: [**Door faces of compatible color and grain**] within each room.
   c. Blueprint matching.
8. Core: [**Particleboard**] .
9. Construction: [**Five or seven plies, bonded**] .

C. Interior Hollow-Core Doors <**Insert drawing designation**>:

1. ANSI/WDMA I.S.1-A Performance Grade: [**Heavy**] Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Species: [**Select white ash**] <**Insert species**>.
4. Cut: [**Rotary cut**] .
5. Match between Veneer Leaves: [**Pleasing**] match.
6. Assembly of Veneer Leaves on Door Faces: [**Center-balance**] match.
7. Pair and set match.
8. Construction: [**Standard**] hollow core.

1.5 FLUSH WOOD DOORS FOR OPAQUE FINISH

A. Exterior Solid-Core Doors <**Insert drawing designation**>:

1. ANSI/WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Faces: [**MDO**] Any closed-grain hardwood of mill option.
4. Core: [**Particleboard**] .
5. Construction: [**Five or seven**] plies, bonded.

B. Interior Solid-Core Doors <**Insert drawing designation**>:

1. ANSI/WDMA I.S.1-A Performance Grade: [**Heavy**] Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Faces: [**MDO**] .
4. Core: [**Particleboard**] .
5. Construction: [**Five or seven plies, bonded**] .

C. Interior Hollow-Core Doors <**Insert drawing designation**>:

1. ANSI/WDMA I.S.1-A Performance Grade: Standard Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Faces: [**MDO**] .

1.6 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors <**Insert drawing designation**>:

1. ANSI/WDMA I.S.1-A Performance Grade: [**Heavy**] Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .

3. Plastic-Laminate Faces: [**Grade HGS**] .
4. Exposed Vertical Edges: [**Plastic laminate that matches faces**] .
5. Core: [**Particleboard**] .
6. Construction: [**Five**] plies, bonded.

B. Interior Hollow-Core Doors <**Insert drawing designation**>:

1. ANSI/WDMA I.S.1-A Performance Grade: [**Standard**] Duty.
2. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
3. Plastic-Laminate Faces: [**Grade HGS**] .
4. Exposed Vertical Edges: [**Plastic laminate that matches faces**] .

1.7 FIRE-RATED WOOD DOOR FRAMES

A. Interior Frames:

1. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
2. Wood Species and Cut: Match species and cut indicated for wood doors unless otherwise indicated.
3. Profile: [**T-stop**] .
4. Construction: Solid lumber, fire-retardant particleboard, or fire-retardant medium density fiberboard (MDF) with veneered exposed surfaces.

1.8 LIGHT FRAMES AND LOUVERS

A. Light-Opening Frames:

1. Wood beads.
2. [**Metal**] for fire doors.

B. Louvers: [**Extruded aluminum with color anodic finish**].

1. Fire-Door Louvers: Galvanized steel with fusible links.

1.9 PRIMING/FINISHING

A. Shop Priming:

1. Doors for Opaque Finish: One coat of wood primer.

B. Factory Finishing: [**Doors indicated as factory finished**].

C. Transparent Factory Finishes:

1. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
2. Finish: [**catalyzed polyurethane**] <**Insert finish designation**>.
3. Effect: Open-grain finish.

D. Opaque Factory Finishes:

1. [**ANSI/WDMA I.S. 1A**] Grade: [**Premium**] .
2. Finish: UV curable acrylated epoxy, polyester or urethane or catalyzed polyurethane .

END OF SECTION 081416

SECTION 083323 - OVERHEAD COILING DOORS

1.1 PERFORMANCE REQUIREMENTS

A. Operability under specified wind load is required.

B. Air-infiltration limit for exterior doors.

C. Windborne-debris impact-resistance performance.

D. Seismic Performance: [**ASCE/SEI 7**] <**Insert requirement**>.

1.2 DOOR ASSEMBLY <**Insert drawing designation**>

A. [**Insulated Service**] Door: Door curtain of [**galvanized steel**] with .

B. Operation Cycles: [**200,000**] <**Insert number**>.

C. Design Wind Load: <**Insert value**>.

D. STC Rating: [**26**] <**Insert value**>.

E. Pass Door(s): frame with .

F. Hood: Match curtain material and finish .

G. Manual door operator.

H. Electric Door Operator: [**Heavy duty**] <**Insert classification**>, with emergency manual [**chain**] operation.

1. Obstruction-detection device.
2. Other Equipment: [**Portable radio-control system**] <**Insert device**>.

1.3 FIRE-RATED DOOR ASSEMBLY <**Insert drawing designation**>

A. Fire-Rated Insulated Service Door: Door curtain of [**galvanized steel**] .

B. Operation Cycles: [**200,000**] <**Insert number**>.

C. Design Wind Load: <**Insert value**>.

D. Fire Rating: [**3/4 hour**] [**1-1/2 hours**] [**and**] [**with smoke control**].

E. STC Rating: [**27**] <**Insert value**>.

F. Pass Door(s): frame with .

G. Hood: [**Match curtain material and finish**] steel.

H. Manual door operator.

I. Electric Door Operator: [**Heavy duty**] <**Insert classification**>, with emergency manual [**chain**] operation.

1. Obstruction-detection device.
2. Other Equipment: [**Portable radio-control system**] <**Insert device**>.

1.4 MAINTENANCE SERVICE

A. Initial Maintenance Service: Nine [**12**] months.

1.5 DEMONSTRATION

A. Factory-authorized representative to train Owner's personnel.

END OF SECTION 083323

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1.1 SUSTAINABILITY REQUIREMENTS

A. ASHRAE 189.1 :

1. Recycled content.
2. Regional materials.
3. Low-emitting sealant.

1.2 PRECONSTRUCTION LABORATORY MOCKUPS

A. Preconstruction Testing Service: engaged.

1.3 WARRANTY

A. Materials and Workmanship: Two Five [**10**] years.

B. Finish: Five 10 [**20**] years.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Contractor to design aluminum-framed systems.

B. Windborne-Debris-Impact Resistance: Wind Zone [**1**] , enhanced protection.

1.5 SYSTEM COMPONENTS

A. Storefront:

1. Exterior Construction: [**Thermally broken**] .
2. Interior Vestibule Construction: [**Nonthermal**] .
3. Glazing System: Gaskets on two sides and structural sealant on two sides.
4. Glazing Plane: [**Front**] .

B. Spandrel Panels: [**Section 074213.19 "Insulated Metal Wall Panels."**]

1. Overall Panel Thickness: [**As indicated**] <**Insert thickness**>.
2. Exterior Skin: Aluminum.
3. Interior Skin: Aluminum.

C. Venting Windows:

1. Window Type: .
2. Minimum Performance Class: .
3. Minimum Performance Grade: .

D. Glazing: Section 088000 "Glazing."

E. Entrance Doors:

1. Door Construction: [**1-3/4-inch overall thickness**] .
2. Door Design: [**As indicated**] .
3. Glazing stops and gaskets.

F. Entrance Door Hardware: [**Section 087100 "Door Hardware."**]

1.6 ALUMINUM FINISHES

A. Aluminum Finishes: [**Class I, clear anodic**] .

1.7 SOURCE QUALITY CONTROL

A. Testing Agency: [**Contractor**] engaged.

1.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner [**Contractor**] engaged.

1.9 MAINTENANCE SERVICE

A. Entrance Door Hardware: [**Six**] months.

1.10 ENTRANCE DOOR HARDWARE SETS

A. See Section 087100 "Door Hardware" .

END OF SECTION 084113

SECTION 084126 - ALL-GLASS ENTRANCES AND STOREFRONTS

1.1 SUSTAINABILITY REQUIREMENTS

A. [**ASHRAE 189.1**] :

1. Low-emitting sealants.

1.2 SUMMARY

A. Exterior all-glass entrance and storefront systems.

1.3 WARRANTY

A. All-Glass Entrance and Storefront Systems: [**Two**] years.

B. Concealed Floor Closers: 10 years.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Contractor to design all-glass entrances and storefronts.

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: [**As indicated on Drawings**] .
3. Deflection Normal to Glazing Plane: Limited to [**1 inch**] .

1.5 EXTERIOR ALL-GLASS ENTRANCE AND STOREFRONT SYSTEMS

A. Fitting Configuration:

1. Manual-Swinging, All-Glass Entrance Doors: [**Patch fittings at head and sill on pivot side only (A-Style)**] [**Patch fittings at head and sill on pivot side, and for lock at sill of swing side (F-Style)**] [**Patch fitting at top and continuous rail fitting at bottom (BP-Style)**] [**Continuous rail fitting at top and bottom (P-Style)**] <**Insert fitting configuration**>.
2. All-Glass Storefronts: [**Recessed glazing channel at top and continuous rail fitting at bottom**] [**Recessed glazing channel at top and bottom**] [**Continuous rail fitting at top and bottom**] <**Insert fitting configuration**>.

B. Fitting Material: [**Aluminum**] .

C. Accessory Fittings:

1. Overhead doorstop.
2. Center-housing lock.
3. U-channel.

4. Glass-support-fin brackets.

D. Glass: Fully tempered.

1. Class 1, Clear Monolithic:
   a. Thickness: [**12**] mm.
   b. Locations: [**As indicated**] .
2. Class 2, Tinted Monolithic:
   a. Color: [**Gray**] .
   b. Thickness: [**12**] mm.
   c. Locations: [**As indicated**] .

E. Entrance Door Hardware.

1. Concealed floor closers and top pivots.
2. Concealed overhead holder.
3. Push-pull set.
4. Single-door and active-leaf locksets.
5. Inactive-leaf locksets.
6. Cylinders.
7. Exit devices.
8. Threshold.

1.6 FIELD QUALITY CONTROL

A. Testing Agency: [**Contractor**] engaged.

END OF SECTION 084126

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:

a. "Metal Doors and Frames"
b. "Flush Wood Doors"
c. "Stile and Rail Wood Doors"
d. "Interior Aluminum Doors and Frames"
e. "Aluminum-Framed Entrances and Storefronts"
f. "Stainless Steel Doors and Frames"
g. "Special Function Doors"
h. "Entrances"

6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:

a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.
b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:
1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.
3) Point-to-point wiring.

4) Risers.

3. Door Hardware Schedule:

a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
c. Indicate complete designations of each item required for each opening, include:
1) Door Index: door number, heading number, and Architect's hardware set number.
2) Quantity, type, style, function, size, and finish of each hardware item.
3) Name and manufacturer of each item.
4) Fastenings and other pertinent information.
5) Location of each hardware set cross-referenced to indications on Drawings.
6) Explanation of all abbreviations, symbols, and codes contained in schedule.
7) Mounting locations for hardware.
8) Door and frame sizes and materials.
9) Degree of door swing and handing.
10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

4. Key Schedule:

a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Final approved hardware schedule edited to reflect conditions as installed.
d. Final keying schedule

e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

a. For door hardware: DHI certified AHC or DHC.
b. Can provide installation and technical data to Architect and other related subcontractors.
c. Can inspect and verify components are in working order upon completion of installation.
d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:

a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
b. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:

a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105

b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware

a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
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.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop 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.

B. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

a. Mechanical Warranty
1) Locks
a) Schlage L Series: 3 years
b) Schlage ND Series: 10 years
2) Exit Devices
a) Von Duprin: 3 years
3) Closers
a) LCN 4000 Series: 30 years

b. Electrical Warranty
1) Locks
a) Schlage: 1 year
2) Exit Devices
a) Von Duprin: 1 year

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Ives 5BB series

2. Acceptable Manufacturers and Products:

a. Hager BB1191/1279 series
b. McKinney TB series
c. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

a. Exterior: Standard weight, steel, 4-1/2 inches (114 mm) high
b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

a. Exterior: Heavy weight, steel, 5 inches (127 mm) high
b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:

a. Exterior: Heavy weight, steel, 5 inches (127 mm) high
b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

    a. Steel Hinges: Steel pins
    b. Non-Ferrous Hinges: Stainless steel pins
    c. Out-Swinging Exterior Doors: Non-removable pins
    d. Out-Swinging Interior Lockable Doors: Non-removable pins
    e. Interior Non-lockable Doors: Non-rising pins

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. Select
    b. Stanley
    c. Roton
    d. ABH
    e. Hager

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:

    a. Von Duprin EPT-10

2. Acceptable Manufacturers and Products:

    a. Securitron CEPT-10
    b. Precision EPT-12C

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. DCI
    b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. DCI
    b. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Schlage L9000 series

2. Acceptable Manufacturers and Products:

a. Sargent 8200 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:

a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
e. Connections – provide quick-connect Molex system standard.

8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

    a. Lever Design: 06A

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

    a. Schlage ND series

2. Acceptable Manufacturers and Products:

    a. Sargent 11-Line

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

    a. Vandlguard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
    b. Lever Design: RHO

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

    a. Von Duprin 99/33A series

2. Acceptable Manufacturers and Products:

    a. Sargent 19-43-80 series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide grooved touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.11 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Von Duprin 6000 Series

2. Acceptable Manufacturers and Products:

   a. Folger Adam 300 Series
   b. HES 1006 Series

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.12 PASSIVE INFRARED MOTION SENSORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Schlage SCAN II Series

2. Acceptable Manufacturers and Products:

   a. RCI 915 Series
   b. Security Door Controls MD-31D Series

B. Requirements:

1. Provide motion sensors as specified in hardware groups.

2.13 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Schlage/Von Duprin PS900 Series

2. Acceptable Manufacturers and Products:

   a. Sargent 3500 series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:

   a. 12/24 VDC Output, field selectable.
   b. Class 2 Rated power limited output.
   c. Universal 120-240 VAC input.
   d. Low voltage DC, regulated and filtered.
   e. Polarized connector for distribution boards.
   f. Fused primary input.
   g. AC input and DC output monitoring circuit w/LED indicators.
   h. Cover mounted AC Input indication.
   i. Tested and certified to meet UL294.
   j. NEMA 1 enclosure.
   k. Hinged cover w/lock down screws.
   l. High voltage protective cover.

2.14 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:

a. Schlage

2. Acceptable Manufacturers and Products:

a. Sargent

B. Requirements:

a. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.

C. Construction Keying:

1. Replaceable Construction Cores.

a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
1) 3 construction control keys
2) 12 construction change (day) keys.

b. Material Supplier along with Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.15 KEYING

A. Scheduled System:

1. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.

a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:

a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
b. Patent Protection: Keys and blanks protected by one or more utility patent(s).

4. Identification:

    a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
    b. Identification stamping provisions must be approved by the Architect and Owner.
    c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
    d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
    e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

5. Quantity: Furnish in the following quantities.

    a. Change (Day) Keys: 3 per cylinder/core.
    b. (Interchangeable Cores Only) Permanent Control Keys: 3.
    c. Master Keys: 6.

2.16 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Telkee

2. Acceptable Manufacturers:

    a. HPC
    b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.

    a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
    b. Provide hinged-panel type cabinet for wall mounting.

2.17 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

    a. LCN 4010/4110/4020 series

2. Acceptable Manufacturers and Products:

    a. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.18 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. Trimco
    b. Burns

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.19 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Rockwood

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.20 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

a. Glynn-Johnson

2. Acceptable Manufacturers:

a. Rixson
b. ABH

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.21 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Trimco
b. Burns

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.22 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

a. Zero International

2. Acceptable Manufacturers:

a. National Guard
b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.23 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.

2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.24 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Schlage

2. Acceptable Manufacturers:

a. GE-Interlogix
b. Sargent

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.25 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
3. Protection Plates: BHMA 630 (US32D)
4. Overhead Stops and Holders: BHMA 630 (US32D)
5. Door Closers: Powder Coat to Match
6. Wall Stops: BHMA 630 (US32D)
7. Latch Protectors: BHMA 630 (US32D)
8. Weatherstripping: Clear Anodized Aluminum
9. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, 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. Verify doors, frames, and walls have been properly reinforced for hardware installation.
B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Where on-site modification of doors and frames is required:

1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
2. Field modify and prepare existing doors and frames for new hardware being installed.
3. When modifications are exposed to view, use concealed fasteners, when possible.
4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:

    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: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
    c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

A. 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. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
L. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
M. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
O. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
P. 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 may impede traffic or present tripping hazard.
Q. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
R. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
S. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 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. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.05 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items per manufacturer's instructions to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
B. Elevation riser diagrams included in this section and/or section 28 1300 are based on the electrified products listed in the hardware sets. Any deviation from the specified products shall make the elevation riser diagrams null and void. If non-specified products are submitted on, material supplier to provide new elevation riser diagrams as part of their submittal package.
C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
D. Hardware Sets:

↯ = Hardware Item Requiring Electrical Coordination

Abbreviation	Name
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	LCN Commercial Division
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

HARDWARE SET: 01

DOOR NUMBER:
100A

EACH TO HAVE:

1	EA	CONT. HINGE	112XY EPT			628	IVE
1	EA	POWER TRANSFER	EPT10			689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL-OP-110MD 24 VDC			626	VON
1	EA	RIM CYLINDER	20-057 ICX			626	SCH
1	EA	FSIC CORE	23-030			626	SCH
1	EA	OFFSET PULL	8190EZHD-10"			630	IVE
1	EA	OH STOP	100S			630	GLY
1	EA	SURFACE CLOSER	4021			689	LCN
1	EA	MOUNTING PLATE	4020-18G			689	LCN
1	EA	DOOR SWEEP	39A X D.W.			A	ZER
1	EA	THRESHOLD	8655A X D.W.			A	ZER
1	EA	CARD READER	MT11 OR MT15 - BY ACCESS CONTROL INTEGRATOR			BLK	SCE
1	EA	DOOR CONTACT	679-05 WD OR HM AS REQ'D			BLK	SCE
1	EA	POWER SUPPLY	PS902 BBK 900-2RS 120/240 VAC			LGR	SCE
1	SET	SEALS	BY ALUM DOOR/FRAME MFG				
1	EA	WIRING DIAGRAMS	ELEVATION 3002				VON

DOOR NORMALLY CLOSED AND LOCKED.
ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT CYLINDER.
REQUEST TO EXIT SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.
KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

HARDWARE SET: 02

DOOR NUMBER:
101A

EACH TO HAVE:

2	EA	CONT. HINGE	112XY		628	IVE
1	EA	REMOVABLE MULLION	KR4954-STAB-ANGLE PLATE		689	VON
1	EA	PANIC HARDWARE	99-EO		626	VON
1	EA	PANIC HARDWARE	99-NL-OP-110MD		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	OFFSET PULL	8190EZHD-10"		630	IVE
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4021		689	LCN
2	EA	MOUNTING PLATE	4020-18G		689	LCN
1	EA	MULLION SEAL	8780N X D.H.		BK	ZER
2	EA	DOOR SWEEP	39A X D.W.		A	ZER
1	EA	THRESHOLD	8655A X D.W.		A	ZER
1	SET	SEALS	BY ALUM DOOR/FRAME MFG			

HARDWARE SET: 03

DOOR NUMBER:
102A 114A 124A 135A 136A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY W/COIN TURN	L9044 06A L583-363 L283-722 OCC/VAC		626	SCH
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 04

DOOR NUMBER:
103A 104A 105A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 05

DOOR NUMBER:
106A 106B 113A

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 6" 4" X 16"		630	IVE
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 06

DOOR NUMBER:
107A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 07

DOOR NUMBER:
108A 108B

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 6" 4" X 16"		630	IVE
1	EA	SURFACE CLOSER	4111 SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 08

DOOR NUMBER:
109A 110B

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12 OR 24 VDC AS REQ'D		630	VON
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	CARD READER	MT11 OR MT15 - BY ACCESS CONTROL INTEGRATOR		BLK	SCE
1	EA	DOOR CONTACT	679-05 WD OR HM AS REQ'D		BLK	SCE
1	EA	MOTION SENSOR	SCANII 12/24 VDC		BLK	SCE
1	EA	POWER SUPPLY	PS902 BBK 900-2RS 120/240 VAC		LGR	SCE
1	EA	WIRING DIAGRAMS	ELEVATION 1054			

DOOR NORMALLY CLOSED AND LOCKED.
ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
RX MOTION SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.
KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

HARDWARE SET: 09

DOOR NUMBER:
110A 111A 112A 115A 118A 120A
121A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5			652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO			626	SCH
1	EA	FSIC CORE	23-030			626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12 OR 24 VDC AS REQ'D			630	VON
1	EA	SURFACE CLOSER	4011			689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	WALL STOP	WS406/407CVX			630	IVE
3	EA	SILENCER	SR64			GRY	IVE
1	EA	CARD READER	MT11 OR MT15 - BY ACCESS CONTROL INTEGRATOR			BLK	SCE
1	EA	DOOR CONTACT	679-05 WD OR HM AS REQ'D			BLK	SCE
1	EA	MOTION SENSOR	SCANII 12/24 VDC			BLK	SCE
1	EA	POWER SUPPLY	PS902 BBK 900-2RS 120/240 VAC			LGR	SCE
1	EA	WIRING DIAGRAMS	ELEVATION 1054				

DOOR NORMALLY CLOSED AND LOCKED.
ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
RX MOTION SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.
KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

HARDWARE SET: 10

DOOR NUMBER:
116A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5			652	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO			626	SCH
1	EA	FSIC CORE	23-030			626	SCH
1	EA	SURFACE CLOSER	4011			689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS			630	IVE
1	EA	WALL STOP	WS406/407CVX			630	IVE
3	EA	SILENCER	SR64			GRY	IVE

HARDWARE SET: 11

DOOR NUMBER:
117A

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 6" 4" X 16"		630	IVE
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 12

DOOR NUMBER:
119A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12 OR 24 VDC AS REQ'D	✓	630	VON
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	CARD READER	MT11 OR MT15 - BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1	EA	DOOR CONTACT	679-05 WD OR HM AS REQ'D	✓	BLK	SCE
1	EA	MOTION SENSOR	SCANII 12/24 VDC	✓	BLK	SCE
1	EA	POWER SUPPLY	PS902 BBK 900-2RS 120/240 VAC	✓	LGR	SCE
1	EA	WIRING DIAGRAMS	ELEVATION 1054	✓		

DOOR NORMALLY CLOSED AND LOCKED.
ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
RX MOTION SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.
KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

HARDWARE SET: 13

DOOR NUMBER:
119B

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 6" 4" X 16"		630	IVE
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 14

DOOR NUMBER:
122A

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
1	EA	PANIC HARDWARE	99-EO		626	VON
1	EA	SURFACE CLOSER	4111 SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142A X D.W. +4"		AA	ZER
1	SET	SEALS	8303AA X D.S.		AA	ZER
1	EA	DOOR SWEEP	39A X D.W.		A	ZER
1	EA	THRESHOLD	8655A X D.W.		A	ZER

EXIT ONLY

HARDWARE SET: 15

DOOR NUMBER:

123A	123D	130A	131A	131B	131C
132A	132B	138C	138D		

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	PANIC HARDWARE	99-L-06	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142A X D.W. +4"	AA	ZER
1	SET	SEALS	8303AA X D.S.	AA	ZER
1	EA	DOOR SWEEP	39A X D.W.	A	ZER
1	EA	THRESHOLD	8655A X D.W.	A	ZER

HARDWARE SET: 16

DOOR NUMBER:

123B	123C	125A	125B	125D	127A
129B	131E	131F	137E	138E	138F

EACH TO HAVE:

ALL HARDWARE BY DOOR MANUFACTURER

HARDWARE SET: 17

DOOR NUMBER:

125C	129A	129C	131D

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: 18

DOOR NUMBER:
126A 126C

EACH TO HAVE:

6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	POWER TRANSFER	EPT10		689	VON
2	EA	CONST LATCHING BOLT	FB51P OR FB61P AS REQ'D		630	IVE
1	EA	DUST PROOF STRIKE	DP1		626	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO 14-049 RX 12V/24V DC		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	MOUNTING BRACKET	MB2		689	IVE
2	EA	SURFACE CLOSER	4111 SCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	SEALS	188S X D.S.		BLK	ZER
1	EA	SECURITY ASTRAGAL	43SP X 188S X D.H.		600	ZER
2	EA	DOOR SWEEP	39A X D.W.		A	ZER
1	EA	THRESHOLD	8655A X D.W.		A	ZER
1	EA	CARD READER	MT11 OR MT15 - BY ACCESS CONTROL INTEGRATOR		BLK	SCE
2	EA	DOOR CONTACT	679-05 WD OR HM AS REQ'D		BLK	SCE
1	EA	POWER SUPPLY	PS902 BBK 900-2RS 120/240 VAC		LGR	SCE
1	EA	WIRING DIAGRAMS	ELEVATION 2066			VON

DOOR NORMALLY CLOSED AND LOCKED.
ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.
KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

HARDWARE SET: 19

DOOR NUMBER:
126B

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12 OR 24 VDC AS REQ'D		630	VON
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	SET	SEALS	188S X D.S.		BLK	ZER
1	EA	DOOR BOTTOM	111AA X D.W.		AA	ZER
1	EA	THRESHOLD	548A X D.W.		A	ZER
1	EA	CARD READER	MT11 OR MT15 - BY ACCESS CONTROL INTEGRATOR		BLK	SCE
1	EA	DOOR CONTACT	679-05 WD OR HM AS REQ'D		BLK	SCE
1	EA	MOTION SENSOR	SCANII 12/24 VDC		BLK	SCE
1	EA	POWER SUPPLY	PS902 BBK 900-2RS 120/240 VAC		LGR	SCE
1	EA	WIRING DIAGRAMS	ELEVATION 1054			

DOOR NORMALLY CLOSED AND LOCKED.
ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
RX MOTION SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.
KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

HARDWARE SET: 20

DOOR NUMBER:
128A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY W/COIN TURN	L9044 06A L583-363 L283-722 OCC/VAC		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 21

DOOR NUMBER:
133A 134A 137A 137B 138A 138B

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE SET: 22

DOOR NUMBER:
133B 134B 137C 137D

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND96TD RHO		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	LOCK GUARD	LG13		630	IVE
1	EA	SURFACE CLOSER	4111 SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142A X D.W. +4"		AA	ZER
1	SET	SEALS	8303AA X D.S.		AA	ZER
1	EA	DOOR SWEEP	39A X D.W.		A	ZER
1	EA	THRESHOLD	8655A X D.W.		A	ZER

END OF SECTION

SECTION 088000 - GLAZING

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Low-emitting sealants.

1.2 QUALITY ASSURANCE

A. Install glazing in mockups specified in other Division 08 Sections.

1.3 WARRANTY

A. Coated-Glass Products: [**10**] <**Insert number**> years.

B. Laminated Glass: [**10**] <**Insert number**> years.

C. Insulating Glass: [**10**] <**Insert number**> years.

1.4 PERFORMANCE REQUIREMENTS

A. Engineering design of glass by Contractor.

B. Windborne-Debris-Impact Resistance of Exterior Glazing: Wind Zone [**1**] .

1.5 MATERIALS

A. Silicone Glazing Sealants: [**Neutral curing, Class 100/50**] .

B. Glazing Tapes: [**Back-bedding-mastic**] type.

1.6 MONOLITHIC GLASS SCHEDULE

A. Clear [**fully tempered**] float glass.

B. Low-iron float glass.

C. Pyrolytic-coated, self-cleaning, low-maintenance, clear float glass.

D. Tinted [**fully tempered**] float glass.

E. Ceramic-Coated Vision Glass Type: [**Fully tempered**] float glass.

F. Reflective-Coated Vision Glass Type: [**Fully tempered**] float glass.

G. Ceramic-Coated Spandrel Glass Type: float glass.

H. Silicone-Coated Spandrel Glass Type: float glass.

I. Reflective-Coated Spandrel Glass Type: float glass.

1.7 LAMINATED GLASS SCHEDULE

A. Clear Laminated Glass Type: [**Fully tempered**] Low-iron fully tempered float glass.

B. Antireflective-Coated Clear Laminated Glass Type: float glass.

C. Tinted Laminated Glass Type: [**Fully tempered**] float glass; outer ply tinted, inner ply clear.

D. Tinted Laminated Glass Type: float glass; clear; tinted interlayer.

E. Ceramic-Coated, Laminated Vision Glass Type: Fully tempered float glass.

F. Reflective-Coated, Laminated Vision Glass Type: [**Fully tempered**] float glass; inner ply clear.

G. Low-E-Coated, Laminated Vision Glass Type: Clear float glass.

H. Reflective-Coated, Laminated Spandrel Glass Type: float glass; inner ply clear.

1.8 INSULATING GLASS SCHEDULE

A. Clear Insulating Glass Type:

1. Outdoor Lite: [**Fully tempered**] float glass.
2. Indoor Lite: [**Fully tempered**] float glass.

B. Low-Iron Insulating Glass Type:

1. Outdoor Lite: Low-iron float glass.
2. Indoor Lite: Low-iron float glass.

C. Pyrolytic-Coated, Self-Cleaning, Low-Maintenance, Clear Insulating Glass Type:

1. Outdoor Lite: Pyrolytic-coated, self-cleaning, low-maintenance, clear float glass.
2. Indoor Lite: float glass.

D. Low-E-Coated, Clear Insulating Glass Type:

1. Outdoor Lite: [**Fully tempered**] float glass.
2. Indoor Lite: [**Fully tempered**] float glass.

E. Tinted Insulating Glass Type:

1. Outdoor Lite: Tinted [**fully tempered**] float glass.
2. Indoor Lite: Clear [**fully tempered**] float glass.

F. Low-E-Coated, Tinted Insulating Glass Type:

1. Outdoor Lite: Tinted [**fully tempered**] float glass.
2. Indoor Lite: Clear [**fully tempered**] float glass.

G. Ceramic-Coated, Insulating Vision Glass Type:

1. Outdoor Lite: [**Heat-strengthened**] [**Fully tempered**] [**Low-iron heat-strengthened**] [**Low-iron fully tempered**] float glass.
2. Indoor Lite: [**Heat-strengthened**] [**Fully tempered**] [**Low-iron heat-strengthened**] [**Low-iron fully tempered**] float glass.

H. Reflective-Coated, Insulating Glass Type:

1. Outdoor Lite: [**Tinted**] [**fully tempered**] float glass.
2. Indoor Lite: Clear [**fully tempered**] float glass.

I. -Coated, Insulating Spandrel Glass Type:

1. Outdoor Lite: float glass.
2. Indoor Lite: Fully tempered float glass.

J. -Coated, Low-E, Insulating Spandrel Glass Type:

1. Outdoor Lite: float glass.
2. Indoor Lite: Annealed float glass.

K. -Coated, Tinted, Insulating Spandrel Glass Type:

1. Outdoor Lite: Tinted float glass.
2. Indoor Lite: Clear float glass.

1.9 INSULATING-LAMINATED-GLASS TYPES

A. Clear Insulating Laminated Glass Type:

1. Outdoor Lite: [**Fully tempered**] float glass.
2. Indoor Lite: Clear laminated glass with two plies of [**fully tempered**] float glass.

B. Low-E-Coated, Clear Insulating Laminated Glass Type:

1. Outdoor Lite: [**Fully tempered**] float glass.
2. Indoor Lite: Clear laminated glass with two plies of [**annealed**] [**heat-strengthened**] [**fully tempered**] float glass.

C. Tinted, Insulating Laminated Glass Type:

1. Outdoor Lite: Tinted [**heat-strengthened**] [**fully tempered**] float glass.

2. Indoor Lite: Clear laminated glass with two plies of [**fully tempered**] float glass.

D. Low-E-Coated, Tinted, Insulating Laminated Glass Type:

1. Outdoor Lite: Tinted [**heat-strengthened**] [**fully tempered**] float glass.
2. Indoor Lite: Clear laminated glass with two plies of [**annealed**] [**heat-strengthened**] [**fully tempered**] float glass.

E. Reflective-Coated, Insulating Laminated Glass Type:

1. Outdoor Lite: [**Tinted**] , [**fully tempered**] float glass.
2. Indoor Lite: Clear laminated glass with two plies of [**fully tempered**] float glass.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 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 steel unless otherwise indicated.
2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 , hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CEMCO; California Expanded Metal Products Co.
b. ClarkDietrich.
c. SCAFCO Steel Stud Company.
d. Steel Construction Systems.

2. Minimum Base-Steel Thickness: As required by performance requirements for horizontal deflection 0.0190 inch .
3. Depth: As indicated on Drawings 3-5/8 inches 6 inches 2-1/2 inches .

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) CEMCO; California Expanded Metal Products Co.
      2) ClarkDietrich.
      3) SCAFCO Steel Stud Company.
      4) Steel Construction Systems.
2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) CEMCO; California Expanded Metal Products Co.
      2) ClarkDietrich.
      3) SCAFCO Steel Stud Company.
      4) Steel Construction Systems.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ClarkDietrich.
   b. MarinoWARE.
   c. MRI Steel Framing, LLC.
   d. SCAFCO Steel Stud Company.
   e. Steel Construction Systems.
2. Minimum Base-Steel Thickness: As indicated on Drawings .

E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ClarkDietrich.
   b. MarinoWARE.
   c. MRI Steel Framing, LLC.
   d. SCAFCO Steel Stud Company.
   e. Steel Construction Systems.

2. Minimum Base-Steel Thickness: As indicated on Drawings .
3. Depth: As indicated on Drawings 7/8 inch .

F. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ClarkDietrich.
   b. MarinoWARE.
   c. MRI Steel Framing, LLC.
   d. SCAFCO Steel Stud Company.
   e. Steel Construction Systems.
2. Configuration: Asymmetrical or hat shaped.

G. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches , wall attachment flange of 7/8 inch , minimum uncoated-steel thickness of 0.0179 inch , and depth required to fit insulation thickness indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ClarkDietrich.
   b. MarinoWARE.
   c. MRI Steel Framing, LLC.
   d. SCAFCO Steel Stud Company.
   e. Steel Construction Systems.

2.3 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. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

C. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings .

D. Furring Channels (Furring Members):

1. Steel Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
   a. Minimum Base-Steel Thickness: 0.0190 inch .
   b. Depth: As indicated on Drawings .
2. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
   a. Configuration: Asymmetrical or hat shaped.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 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.

B. Install tracks 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 that penetrate 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 track section (for cripple studs) at head and secure to jamb studs.
   a. Install two studs at each jamb unless otherwise indicated.

3. 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.
   a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

C. 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.

D. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

E. 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.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

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.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. 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

1.1 QUALITY ASSURANCE

A. Mockups for the following:

1. Levels of exposed gypsum board finish.
2. Texture finishes.

1.2 SUSTAINABILITY REQUIREMENTS

A. :

1. Recycled content.
2. Regional materials.
3. Low-emitting adhesives.

1.3 MATERIALS

A. Interior Gypsum Board:

1. Gypsum wallboard.
2. Gypsum board, Type X.
3. Flexible gypsum board.
4. Gypsum ceiling board.
5. Foil-backed gypsum board.
6. Abuse-resistant gypsum board.
7. Impact-resistant gypsum board.
8. Mold-resistant gypsum board.

B. Specialty Gypsum Board:

1. Gypsum board, Type C.
2. Glass-mat interior gypsum board.
3. Acoustically enhanced gypsum board.
4. Skim-coated gypsum board.

C. Exterior Gypsum Board for Ceilings and Soffits:

1. Exterior gypsum soffit board.
2. Glass-mat gypsum sheathing board.

D. Tile-Backing Panels:

1. Glass-mat, water-resistant backing board.
2. Cementitious backer units.
3. Water-resistant gypsum backing board.

E. Trim Accessories:

1. Interior.
2. Exterior.
3. Aluminum: Extruded profiles.

F. Auxiliary Materials:

1. Laminating Adhesive.
2. Acoustical Sealant.

G. Texture Finishes:

1. Polystyrene aggregate ceiling finish.
2. Aggregate finish.
3. Non-aggregate finish.
4. Acoustical finish.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

1.1 QUALITY ASSURANCE

A. Mockup for each type of floor tile installation.

B. Mockup for each type of wall tile installation.

1.2 SUSTAINABILITY REQUIREMENTS

A. :

1. Low-emitting adhesives.
2. Low-emitting floor sealer.

1.3 TILE PRODUCTS

A. Mosaic Ceramic Tile Type <**Insert drawing designation**> : Unglazed Glazed.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Arizona Tile; or a comparable product by another manufacturer .
2. Composition: [**Porcelain**] [**Impervious natural clay or porcelain**] [**Vitreous or impervious natural clay or porcelain**].
3. Size: [**1 by 1 inch**] [**1 by 2 inches**] [**2 by 2 inches**] [3 by 3 inches (76 by 76 mm)] [4 by 4 inches (102 by 102 mm)] [6 by 6 inches (152 by 152 mm)] [7-3/4 by 3-7/8 inches (197 by 98 mm)] [7-7/8 by 7-7/8 inches (200 by 200 mm)] [11-13/16 by 11-13/16 inches (300 by 300 mm)] [165 by 333 mm] [200 by 250 mm] [250 by 250 mm] [333 by 333 mm] [400 by 400 mm] .
4. Description: <**Insert description**>.
5. Trim Shapes: [**Base cove**] [**Bead (bullnose) base cap**] [**Surface bullnose base cap**] [**Bead (bullnose) wainscot cap**] [**Surface bullnose wainscot cap**] [**Bead (bullnose) external corner**] [**Surface bullnose external corner**] [**Coved internal corner**] [**Tapered transition**].

B. Porcelain Tile Type <**Insert drawing designation**> : Unglazed Glazed.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Arizona Tile; or a comparable product by another manufacturer .
2. Size: [**3 by 3 inches**] [**4 by 4 inches**] [**6 by 6 inches**] [**7-3/4 by 3-7/8 inches**] [**7-7/8 by 7-7/8 inches**] [**11-13/16 by 11-13/16 inches**] [**165 by 333 mm**] [**200 by 250 mm**] [**250 by 250 mm**] [**333 by 333 mm**] [**400 by 400 mm**] <**Insert dimensions**>.
3. Face Size Variation: Rectified.
4. Description: <**Insert description**>.
5. Trim Shapes: [**Base cove**] [**Bead (bullnose) base cap**] [**Surface bullnose base cap**] [**Bead (bullnose) wainscot cap**] [**Surface bullnose wainscot cap**] [**Bead**

(bullnose) external corner] [**Surface bullnose external corner**] [**Coved internal corner**] [**Tapered transition**].

C. Accessories: [**Soap**] [**and**] [**paper**] holder.

1.4 ACCESSORY MATERIALS

A. Thresholds: [**Granite**] [**Marble**] [**Slate**].

B. Tile Backing Panels: [**Cementitious backer units**] [**Fiber-cement underlayment**].

C. Waterproof Membrane: [**Chlorinated polyethylene sheet**] [**PVC sheet**] [**Polyethylene sheet**] [**Fabric-reinforced, modified-bituminous sheet**] [**Fabric-reinforced, fluid-applied membrane**] [**Fluid-applied membrane**] [**Latex-portland cement**] [**Urethane waterproofing and tile-setting adhesive**].

D. Crack Isolation Membrane: [**Chlorinated polyethylene sheet**] [**PVC sheet**] [**Polyethylene sheet**] [**Corrugated polyethylene**] [**Fabric-reinforced, modified-bituminous sheet**] [**Fabric-reinforced, fluid-applied membrane**] [**Fluid-applied membrane**] [**Latex-portland cement**] [**Urethane crack isolation membrane and tile-setting adhesive**].

E. Metal edge strips.

1.5 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floors on Concrete:

1. TCNA F111: Cement mortar bed with cleavage membrane. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.
2. TCNA F112: Cement mortar bed bonded to concrete. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.
3. TCNA F113: Thinset mortar. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
4. TCNA F114: Cement mortar bed with cleavage membrane, epoxy grout.
5. TCNA F115: Thinset mortar, epoxy grout.
6. TCNA F116: [**Organic adhesive**] [**Water-cleanable, tile-setting epoxy**] . [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
7. TCNA F121: Cement mortar bed on waterproof membrane. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.
8. TCNA F122: Thinset mortar on waterproof membrane. High-performance grout.
9. TCNA F125A: Thinset mortar on crack isolation membrane. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
10. TCNA F131: Water-cleanable, tile-setting epoxy; epoxy grout.
11. TCNA F132: Water-cleanable, tile-setting epoxy on cured cement mortar bed [**bonded to concrete subfloor**] [**installed over cleavage membrane**]; epoxy grout.

B. Interior Floors, Wood Subfloor:

1. TCNA F121: Cement mortar bed on waterproof membrane. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
2. TCNA F141: Cement mortar bed with cleavage membrane. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
3. TCNA F142: Organic adhesive. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
4. TCNA F143: Water-cleanable, tile-setting epoxy; epoxy grout.
5. TCNA F144: [**Thinset mortar**] [**Water-cleanable, tile-setting epoxy**] on cementitious backer units or fiber-cement underlayment. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
6. TCNA F150/160: Thinset mortar on exterior-glue plywood. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.

C. Interior Radiant Heat Floors, Concrete Subfloor:

1. TCNA RH110: Thinset mortar [**on crack isolation membrane**]; hydronic piping installed in concrete. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
2. TCNA RH117: Cement mortar bed (thickset) with hydronic piping installed in mortar bed. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
3. TCNA RH112: Thinset mortar [**on crack isolation membrane**]; hydronic piping encapsulated in cementitious self-leveling underlayment. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
4. TCNA RH115: Thinset mortar; electric radiant system encapsulated in thinset mortar. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
5. TCNA RH116: Thinset mortar [**on crack isolation membrane**]; electric radiant system encapsulated in cementitious self-leveling underlayment. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.

D. Interior Radiant Heat Floors, Wood Subfloor:

1. TCNA RH123: Thinset mortar [**on crack isolation membrane**]; hydronic piping encapsulated in cementitious self-leveling underlayment. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
2. TCNA RH130: Thinset mortar on exterior-glue plywood; electric radiant system encapsulated in thinset mortar. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
3. TCNA RH135: Thinset mortar on cementitious backer units or fiber-cement underlayment; electric radiant system encapsulated in thinset mortar. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
4. TCNA RH140: Thinset mortar [**on crack isolation membrane**]; electric radiant system encapsulated in cementitious self-leveling underlayment. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
5. TCNA RH141: Cement mortar bed (thickset) with hydronic piping installed in mortar bed. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.

E. Interior Walls, Masonry or Concrete:

1. TCNA W202: Thinset mortar. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
2. TCNA W211: Cement mortar bed bonded to substrate. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
3. TCNA W221: Cement mortar bed on metal lath [**over cleavage membrane**] [**over waterproof membrane**] . [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
4. TCNA W222: One-coat cement mortar bed on metal lath [**over cleavage membrane**] [**over waterproof membrane**] . [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
5. TCNA W223: Organic adhesive. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.

F. Interior Walls, Wood or Metal Studs or Furring:

1. TCNA W221: Cement mortar bed [**over cleavage membrane**] [**over waterproof membrane**] on solid backing. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
2. TCNA W222: One-coat cement mortar bed [**over cleavage membrane**] [**over waterproof membrane**] on solid backing. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
3. TCNA W223: Organic adhesive on solid backing. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.
4. TCNA W231/W241: Cement mortar bed. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.
5. TCNA W242: Organic adhesive on gypsum board. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
6. TCNA W243: Thinset mortar on gypsum board. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
7. TCNA W244: Thinset mortar on cementitious backer units or fiber-cement underlayment [**over vapor-retarder membrane**] . [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
8. TCNA W245 or TCNA W248: Thinset mortar on glass-mat, water-resistant gypsum backer board. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.

G. Shower Receptor and Walls, Concrete or Masonry:

1. TCNA B414: Cement mortar bed over vapor-retarder membrane. [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
2. TCNA B415: [**Thinset mortar**] [**Organic adhesive**] [**Water-cleanable, tile-setting epoxy**] on [**waterproof membrane over cementitious backer units or fiber-cement backer board**] [**cementitious backer units or fiber-cement backer board over vapor-retarder membrane**] . [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.
3. TCNA B420: Thinset mortar on [**waterproof membrane over coated glass-mat, water-resistant gypsum backer board**] [**coated glass-mat, water-resistant**

gypsum backer board over vapor-retarder membrane] . [**Sand-portland cement**] [**Standard**] [**High-performance**] [**Water-cleanable epoxy**] grout.

4. TCNA B421: Thinset mortar on waterproof membrane over solid backing. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.
5. TCNA B422: Thinset mortar on waterproof membrane with integrated bonding flange for bonded membranes. [**Sand-portland cement**] [**Standard**] [**High-performance**] grout.

END OF SECTION 093013

SECTION 095123 - ACOUSTICAL TILE CEILINGS

1.1 QUALITY ASSURANCE

A. Mockups for each form of construction.

1.2 SUSTAINABILITY REQUIREMENTS

A. :

1. Recycled content.
2. Low-emitting adhesives.
3. Low-emitting ceilings.

1.3 PERFORMANCE REQUIREMENTS

A. Engineering design of seismic restraints by Contractor.

B. Flame-Spread Index: [**Class A**] [**Class B**] [**Class C**] according to ASTM E1264.

C. Smoke-Developed Index: 50 450 <**Insert value**> or less.

1.4 PRODUCTS

A. Acoustical Tiles : Fire-Resistance Rated : See reflected ceiling plans .

1. Type IV: Ultima High NRC Square Lay-in.
2. Type: <**Insert requirement**>.
3. Pattern: [**C (perforated, small holes)**] [**CD (perforated, small holes and fissured)**] [**CE (perforated, small holes and lightly textured)**] [**D (fissured)**] [**E (lightly textured)**] [**F (heavily textured)**] [**G (smooth)**] [**I (embossed)**] [**J (embossed-in-register)**] <**Insert pattern**>.
4. LR: Not less than 0.90. .
5. CAC: Not less than 30. .
6. NRC: Not less than 0.60. .
7. AC: 170. .
8. Thickness: [**5/8 inch**] 3/4 inch <**Insert dimension**>.
9. Modular Size: 24 in x 24 in .

B. Metal Suspension System: <**Insert same designation used for related acoustical tiles**>.

1. High-humidity finish.
2. Direct Hung, Double Web , Fire Rated : Intermediate [**Heavy**] duty.
3. Access: Upward [**Downward**] and end pivoted or side pivoted.
4. Attachment Devices: [**Cast in place**] [**Postinstalled expansion**] [**Postinstalled bonded**] [**or**] [**power actuated**].

5. Seismic perimeter stabilizer bars, struts, and clips.

C. Direct Attachment with [**Acoustical Tile Adhesive**] [**Staples**] : <**Insert same designation used for related acoustical tiles**>.

D. Metal Edge Moldings and Trim: Roll-formed sheet metal [**Extruded aluminum**].

1.5 ERECTION TOLERANCES

A. Main and Cross Runners: Level to within 1/8 inch in 12 feet(3mm in 3.6 m)<**Insert dimensions**>.

B. Moldings and Trim: Level to within 1/8 inch in 12 feet(3mm in 3.6m)<**Insert dimensions**>.

1.6 FIELD QUALITY CONTROL

A. Special Inspection: Owner [**Contractor**]-engaged special inspector for seismic design.

B. Testing Agency: Owner [**Contractor**] engaged.

END OF SECTION 095123

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Low-emitting adhesives.
2. Low-emitting flooring (stair accessories).

1.2 PRODUCTS

A. Resilient Base: Thermoplastic rubber Vinyl, thermoplastic.

1. Style and Location:
   a. Straight: In areas with carpet <**Insert requirements**>.
   b. Cove: In areas with resilient flooring <**Insert requirements**>.
2. Minimum Thickness: 0.125 inch 0.080 inch <**Insert dimension**>.
3. Height: 2-1/2 inches 4 inches 6 inches As indicated on Drawings.
4. Outside Corners: [**Job formed**] [**Preformed**] Job formed or preformed.
5. Inside Corners: [**Job formed**] [**Preformed**] Job formed or preformed.

B. Resilient Accessories: Rubber Vinyl.

1. Cap for cove carpet.
2. Cap for cove resilient flooring.
3. Carpet bar for tackless installations.
4. Carpet edge for glue-down applications.
5. Nosing for carpet.
6. Nosing for resilient flooring.
7. Reducer strip for resilient flooring.
8. Joiner for tile and carpet.
9. Transition strips.

C. Installation Materials:

1. Trowelable leveling and patching compounds.
2. Adhesives.
3. Stair-tread-nose filler.
4. Metal edge strips.
5. Floor polish.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Low-emitting adhesives and chemical-bonding compounds.
2. Low-emitting sealants.
3. Low-emitting flooring.

1.2 PRODUCTS

A. Solid Vinyl Floor Tile: [**Monolithic**] Surface-decorated vinyl tile.

1. Surface: Smooth Embossed.
2. Thickness: [**0.080 inch**] [**0.100 inch**] [**0.120 inch**] 0.125 inch <**Insert dimension**>.
3. Size: 12 by 12 inches [**18 by 18 inches**] [**24 by 24 inches**] [**36 by 36 inches**] [**3 by 36 inches**] <**Insert dimensions**>.
4. Seamless-Installation Method: Heat welded Chemically bonded <**Insert requirements**>.

B. Rubber Floor Tile: Homogeneous rubber tile, solid color Homogeneous rubber tile, through mottled .

1. Wearing Surface: Smooth Textured Molded pattern.
   a. Molded-Pattern Figure: [**Raised discs**] Raised squares <**Insert pattern**>.
2. Thickness: 0.125 inch <**Insert dimension**>.
3. Size: 12 by 12 inches 24 by 24 inches <**Insert dimensions**>.
4. Seamless-Installation Method: Heat welded Chemically bonded <**Insert requirements**>.

C. Vinyl Composition Floor Tile: Solid-color Through-pattern Surface-pattern tile.

1. Wearing Surface: Smooth Embossed.
2. Thickness: 0.125 inch <**Insert dimension**>.
3. Size: 12 by 12 inches.

D. Resilient Terrazzo Floor Tile:

1. Thickness: 1/8 inch [**3/16 inch**].
2. Size: 12 by 12 inches.

E. Installation Materials:

1. Trowelable leveling and patching compounds.
2. Adhesives.
3. Floor polish.
4. Joint sealant for resilient terrazzo floor tile.

5. Sealers and finish coats for resilient terrazzo floor tile.

END OF SECTION 096519

SECTION 09 9600
WATER TANK COATINGS

PART 1 – GENERAL

1.01 SCOPE

A. Interior and exterior coatings, and insulation, of steel water reservoirs.

B. Coating of exposed piping.

C. All coating testing.

1.02 REFERENCES

A. Steel Structures Painting Council, “Steel Structures Painting Manual Vol. 2: SSPC Specifications”.

B. American Standard Scheme for the Identification of Piping Systems, Standard A13_1.

C. National Sanitation Foundation: NSF Specifications.

D. AWWA D102-97: Coating Steel Water Storage Tanks

1.03 RELATED SECTIONS

A. SECTION 33 1613 - SURFACE WATER-STORAGE TANK

1.04 SUBMITTAL DATA

A. Submittals shall be made in accordance with Section 01 3000 Administrative Requirements of the Project Manual.

B. Manufacturer’s product – specific application instructions.

C. Schedule of products to be used and mil thickness to be applied in accordance with manufacturer’s recommendations.

D. Manufacturer’s standard color selection chart.

E. Applicator’s qualifications and manufacturer’s training certifications.

1.05 DELIVERY AND HANDLING

A. Coating materials shall be delivered to the site in the original, sealed containers.

B. Containers shall be opened or used only after Owner’s or Engineer’s inspection of contents.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Tnemec:

1. Tank Interior Primer - Hydro-Zinc Series 91-H2O
2. Tank Interior (Intermediate and Final Coat) - Pota-pox Series 20
3. Tank Exterior Primer - Series 66
4. Tank Exterior Finish - Polyurethane Series 1074U Endura-Shield II
5. Piping Series N69 Hi Build Epoxoline II B. Engineer - approved equivalent.

2.02 PAINT SYSTEMS

A. Tank Outside Coating System (OCS):

1. Two coats consisting of one coat of primer and one coat of Exterior Finish.
2. Materials:
   a. The first and intermediate coats shall be tinted to provide color contrast between coats.
3. Thickness: dry film thickness, in mils of the paint shall be:
   a. 1st coat: 4.0 - 5.0 mils
   b. Intermediate coat: 4.0 - 5.0 mils
   c. Total system: 8.0 – 10.0 mils
4. Color: selected by Owner/Architect from paint system manufacture’s standard colors.
5. AWWA Paint System Designation: OCS-5-S

B. Prefabricated Vertical Standing Seam Panel System.

1. For insulation of tank walls.
2. Materials:
   a. Per NFPA 22 following installation of outside primer and intermediate coats
   b. ASTM B-209, 3105-H14, or 1100-H14
   c. Embossed polyester painted aluminum, 0.024-inch thickness, 24-inches wide by height of sidewall
   d. Laminated to insulation with non-flammable contact adhesive e. 2.5-inch thick polyisocyanurate foam
3. Installation:

a. Attached to ¼-inch stainless steel cables places around tank on 2-foot centers with bottom cable 18-inches from the bottom and top cable 12- inches from the rim.

b. Pull tight and tension with 3/8-inch x 6-inch stainless steel turnbuckles.

C. Standing Seam Panel System

1. For insulation of tank roof.

2. Materials:

a. Per NFPA 22 following installation of outside primer and intermediate coats

b. Radial design

c. 0.024-inch thick stucco embossed polyester painted aluminum, 3-feet wide at heel and necking down in a gored fashion

3. Installation:

a. Fasten standing seam to 3/8-inch mild steel round bar, tack welded to tank roof every 5-feet. Round bar shall be on 3-foot circular centers.

b. Run seams perpendicular to round bar and secure at each intersection with ½-inch wide by 0.020-inch stainless straps, looped around the bar. Fold end into the double folded standing seam, in the slope direction.

c. Fit top rim of tank with 1 ½-inch x 7-inch x 1/8-inch thick aluminum extrusion, bolted in place by ¼-inc thick x 1 ½-inch stainless steel bolts, with the 1 ½- inch leg extended out and set at a height equal to the roof insulation thickness.

D. Tank Inside Coating System (ICS) :

1. Used for any surfaces in contact with water or exposed to water vapor

2. Color: white

3. Materials:

a. Suitable for potable water service, evaluated for long-term fresh water resistance and demonstrated satisfactory service in fresh water for at least 18 months; approved by NSF for potable water use.

b. Packaging: packaged in containers of suitable size so that one container of each component is used in mixing the paint to the proper proportions.

4. Thickness: the dry film thickness, in mils of the paint shall be:

a. Primer: 3.0 - 5.0

b. Finish coats: 4.0 – 6.0 per coat, dry film thickness to be checked between coats

c. Total system: 11.0 – 15.0

E. AWWA Paint System Designation: ICS-2-W

1. First coat: 4.0 to 6.0 mils DFT.

2. Second coat: 4.0 to 6.0 mils DFT.

3. Total minimum mils DFT shall be 8.0 mils.

4. AWWA Paint System Designation: ICS-2-W.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

A. Tank Interior Surfaces:

1. New Tank:

a. The interior surfaces of new tanks shall be cleaned by SSPC-SP10, “Near White Blast Cleaning”.

b. All mill scale and rust shall be removed.

B. Tank Exterior Surfaces:

1. New Tank:

a. For new tanks, exterior surfaces shall be cleaned according to SSPC-SP6, “Commercial Blast Cleaning”.

b. All mill scale and rust shall be removed.

3.02 FIELD WELDS AND ABRASIONS

A. All weld areas and all areas on which the shop paint has been damaged shall be cleaned after field welding is completed.

B. Exterior surfaces: exterior surfaces shall be cleaned by SSPC-SP6, “Commercial Blast Cleaning” except that CCPC-SP3, “Power Tool Cleaning” may be used when this is a satisfactory method of surface preparation for the primer to be applied.

C. Interior surfaces: interior surfaces shall be cleaned by SSPC-SP10, “Near White Blast Cleaning”.

3.03 APPLICATION

A. The requirements of SSPC-PA1 shall be followed with regard to storage of paint and thinner, mixing, thinning, painting contact surfaces, application of shop and field paint and drying of painted steel.

B. Timing of Application

1. Paint materials shall be applied immediately after surface preparation (and wash priming when required), before any surface rusting occurs or any dust or soil has accumulated.
2. Shop-applied prime coats may be applied by any method that attains an acceptable coating.
3. Field priming shall be performed by brushing or spraying tank interior surfaces and by brushing, rolling, or spraying tank exterior surfaces.
4. When plates have been shop primed, all weld areas on which shop primer has been damaged shall be cleaned again in the field and primed with the same primer, applied to the same dry film thickness as the shop coat.

C. Tank Exterior and Interior Surface Painting:

1. Exterior surfaces shall be painted by spraying or rolling.
2. Interior surfaces shall be painted by spraying.
3. Conventional spraying, airless spraying and hot spraying are acceptable methods.

D. Interior Coating Standard:

1. The interior coating shall be applied to give a “pinhole-free” surface over the entire interior tank surface, as defined by NACE Standard RP0188-88.
2. The term “pinhole-free” means absolutely continuous.

E. Coating System Application on Other Surfaces:

1. Brush-apply one coat of the interior coating system at all of the tank’s welded connections, edges and inside angles.
2. This “striped” application shall be in addition to the DFT specified and shall be performed prior to the first spray application of the coating system.

3.04 TESTING

A. Paint Film Thickness:

1. Paint film thickness shall be verified by measuring the wet film thickness of each coat as it is applied and the dry film thickness of the entire system.
2. When film thicknesses are indicated without an indicated tolerance, the allowable gauge tolerance shall be twice the indicated accuracy of the measurement; that is, for a measurement with an indicated accuracy of +/- 0.25 mil, the allowable tolerance is +/- 0.5 mil.

B. Wet Film Thickness:

1. The wet film thickness shall be measured with a gauge that will measure the wet film thickness within an accuracy of +/- 0.5 mil.

2. A wet film thickness measurement shall be made for each 100 sq. ft. of surface painted.

C. Dry Film Thickness(DFT):

1. The dry film thickness shall be measured in accordance with SSPC-PA2 with a magnetic gauge that will measure the dry film thickness within an accuracy of +/- 0.25 mil.

2. As many dry film thickness measurements as are feasible shall be made so that there is a minimum of one measurement for each 100 sq. ft. of surface painted.

3. If an Owner's representative is present at the site, the dry film thickness measurements shall be made while surfaces are accessible at locations selected by the Owner's representative.

4. Extensive re-rigging after paint has dried so dry film thickness measurements can be made is not required, provided that:
   a. The number of measurements made is equivalent to one for each 100 sq. ft. of surface painted.
   b. The location of the measurements is reasonably distributed.
   c. All measurements taken meet or exceed the specified minimum dry film thickness.

5. Additional coats shall be applied in order to attain the minimum dry film thickness specified for the painted system.

D. Holiday Testing Interior Surfaces:

1. For the inside paint system, 100% of the painted surfaces below the overflow shall be tested with a wet-sponge, low voltage holiday detector after the paint has cured to the extent recommended by paint manufacturer.

2. The sponge shall be kept saturated with an electrolyte (5% NaCl) and a surfactant (2% household detergent).

3. During testing the wet sponge shall be kept in continuous contact with the painted surface.

4. Locations where holidays are detected shall be marked for repair and retested after repairs have been completed.

3.05 COATINGS CERTIFICATION

A. Interior and exterior coatings shall be certified by an independent National Association of Corrosion Engineers (NACE)-certified and -accredited inspector, and acceptable to the Owner.

B. NACE Certified Coating Inspector Obligations:

1. The NACE-certified coatings inspector shall make all required site inspections and tests at the tank fabrication shop and the project site in order that he may certify the coatings system was constructed in compliance with the coating manufacturer's recommendations, this specification, and the applicable standards referenced herein.

2. Tests performed at the project site will be scheduled in order that the owner's representative on the project is present during all testing.

C. Test Report:

1. A test report shall be prepared and submitted to the Owner at the conclusion of dry film thickness and indicating:
   a. The film thickness gauge used.
   b. The locations where tests were made.
   c. The dry film thickness at each location.
   d. The name of the person making the tests.
   e. The names of the persons who are representing the Contractor and the Owner and who are witnessing the test.

2. The test report shall be certified by the NACE certified coating inspector, indicating compliance with this specification.

3. The report will also include the dates and times of inspections made at the tank fabrication site for surface preparation.

PART 4 – MEASUREMENT AND PAYMENT

A. Payment for the work of this section shall be part of the work of SECTION 33 1613 - SURFACE WATER-STORAGE TANK as shown on the Drawings. Payment shall include coating testing and inspection and eleven month anniversary inspection.

END OF SECTION

SECTION 099123 - INTERIOR PAINTING

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Low-emitting paints and coatings.
2. Product declarations.

1.2 SUMMARY

A. Primers.

B. Finish coatings.

C. Floor sealers and paints.

D. Dry-fall coatings.

1.3 QUALITY ASSURANCE

A. Mockups for each color and finish.

1.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner engaged.

1.5 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex system.
2. Latex over latex aggregate system.
3. Latex aggregate system.
4. Institutional low-odor/VOC latex system.
5. High-performance architectural latex system.
6. Water-based light-industrial coating system.
7. Concrete stain system.

B. Concrete Substrates, Traffic Surfaces:

1. Latex floor enamel system.
2. Alkyd floor enamel system.
3. Concrete stain system.
4. Water-based concrete floor sealer system.
5. Solvent-based concrete floor sealer system.

C. Cement Board Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Alkyd system.

D. Clay Masonry Substrates:

1. Latex system.
2. Latex aggregate system.
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Water-based light-industrial coating system.
6. Alkyd system.

E. CMU Substrates:

1. Latex system.
2. Latex aggregate system.
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Water-based light-industrial coating system.
6. Alkyd system.

F. Steel Substrates:

1. Latex system, alkyd primer.
2. Latex over shop-applied quick-drying shop primer system.
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Water-based light-industrial coating system.
6. Water-based light-industrial coating system over epoxy primer system.
7. Water-based dry-fall system.
8. Water-based dry fall over shop-applied quick-drying shop primer system.
9. Alkyd system.
10. Alkyd over surface-tolerant primer system.
11. Quick-dry enamel system
12. Alkyd dry-fall system.
13. Alkyd dry fall over quick-drying primer system.
14. Aluminum paint system.

G. Galvanized-Metal Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Water-based dry-fall system.
6. Alkyd over cementitious primer system.

7. Alkyd dry-fall system (cementitious primer).
8. Aluminum paint system.

H. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Alkyd system.

I. Copper Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Alkyd system.

J. Stainless Steel Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Alkyd system.

K. Exposed Wood Framing:

1. Latex over latex primer system.
2. Latex over alkyd primer system.
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Alkyd system.

L. Finish Carpentry: Doors .

1. Latex over latex primer system.
2. Latex over alkyd primer system.
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Water-based light-industrial coating system.
6. Water-based alkyd system.
7. Alkyd system.

M. Architectural Woodwork: casework.

1. Latex over latex primer system.
2. Latex over alkyd primer system.
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.

5. Water-based light-industrial coating system.
6. Alkyd system.

N. Wood Traffic Surfaces: Floors .

1. Latex porch and floor enamel system.
2. Alkyd floor enamel system.

O. Wood Shingles and Shakes:

1. Latex over latex primer system.
2. Latex over alkyd primer system.
3. Alkyd system.

P. Fiberglass Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Alkyd system.

Q. Plastic Substrates:

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light-industrial coating system.
5. Alkyd system.

R. Spray-Textured Ceiling Substrates:

1. Latex, flat system.
2. Latex system.
3. Latex over alkyd sealer system.
4. Alkyd, flat system.
5. Alkyd over alkyd sealer system.

S. Gypsum Board and Plaster Substrates:

1. Latex over latex sealer system.
2. Latex over alkyd primer system (for plaster only).
3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Water-based light-industrial coating system.
6. Alkyd over latex sealer system.

T. Acoustic Panels and Tiles:

1. Latex, flat system.
2. Latex over alkyd primer system.

3. Institutional low-odor/VOC latex system.
4. High-performance architectural latex system.
5. Alkyd, flat system.

U. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings <**Insert description**>.

1. Latex system.
2. Institutional low-odor/VOC latex system.
3. Alkyd system.
4. Aluminum paint system.

V. Bituminous-Coated Substrates:

1. Latex system.
2. Alkyd system.
3. Aluminum paint system.

END OF SECTION 099123

SECTION 10-1400
SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Interior and Exterior Signage

1.2 QUALITY ASSURANCE
A. Single Source Requirements: Obtain all products in this section from a single supplier. Supplier must fabricate and install.
B. Fabricator/Installer shall have five years' experience fabricating/installing products of similar type and scope as those specified in this section.

1.3 REFERENCES
A. Regulatory Requirements: All products shall meet/follow these requirements/codes:
1. 2010 ADA Standards for Accessible Design
2. Building Codes (for example IBC, IFC) as specified in the Permitted Plans

1.4 SUBMITTALS
A. Submit under provisions of Section 01300.
B. Prior to final Design Drawings, provide samples (Qty 3) of Exterior Sign Paint, Interior Signage Substrate.
C. Design Drawings showing layout, profiles, and product components, including dimensions, fonts, and mounting methods. Drawings shall contain elevations and section details for all work in this section where applicable.
D. Sign Location Plan
E. Message Schedule

1.5 DELIVERY, STORAGE AND HANDLING
A. Submit under provisions of Section 01300.
B. Signage may be supplied early to meet lead-time requirements to avoid construction delays. General Contractor/Owner to inspect and sign for receipt of products (whether stored on site or in other approved area)
C. Deliver products in unopened, undamaged containers with labels clearly identifying product name.
D. Protect Stored Products from weather, temperature, and other harmful conditions in accordance with manufacturer's instructions.
E. Protect materials during handling and installation to prevent damage.

1.6 WARRANTY
A. Warrantees must meet these minimum requirements
1. Interior Room Signs-Warranted for the life of the building.
2. Dimensional Letters-Warranted for the life of the building.
3. Cut Vinyl/Lamination Applications-Warranted for 5-7 years (mirror the 3M vinyl/Laminate Warranty)
4. Direct Print Applications-Warranted for 15 years Interior and 3-5 years Exterior with 3M's 8510/8520 Laminate applied.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Listed by Products.
B. Substitutions permitted with approved Request for Substitution.

2.2 INTERIOR AND EXTERIOR ROOM SIGNS, RESTROOM SIGNS, LOCKER ROOM SIGNS, AND TACTILE EXIT SIGNS

A. Product: Century Sign Builders, Basic Sign System (https://www.csbsigns.com/project/basic-sign-system/)

1. Sign Types: Refer to sign type in design drawings (RS, RR, LR, MR, EE, MO)
a. Base Material Product: Romark 1/8th thick ADA Alternative, matte non-glare single-ply modified acrylic.
b. Base Material Color: Refer to sign type drawings.
c. Tactile Raised Lettering and Symbols Material Product: Romark, 1/32th ADA Alternative matte non-glare single- ply modified acrylic.
d. Tactile Raised Lettering and Symbols Color: Refer to sign type drawings.
e. Tactile Raised Lettering Font: Refer to sign type drawings.
f. Tactile raised Lettering and Symbols fabrication method: Tactile lettering and symbols shall be formed using rotary engraving method and bonded to sign base material using 3M Scotch 467HP adhesive. Text, numbers and symbols must have 1/32” return cut to 22 degree angle. Text, numbers and symbols must be constructed with materials having embedded coloration that is the final approved color for the signs. Products with painted or otherwise applied coloration method are not acceptable.
g. Braille Method: Braille must be constructed using the Edgerton Grade 2 Braille System using clear Raster beads
2. Sign Installation: Signs shall be mounted using double-sided vinyl foam tape (1/16” thickness) and silicon adhesive

2.3 EVACUATION DIAGRAM LIFE SAFETY SIGN

A. Product: Century Sign Builders, Basic Sign System (https://www.csbsigns.com/project/basic-sign-system/)

1. Sign Types: Refer to sign type in design drawings (EV)
a. Base Material Product: Romark 1/8th thick ADA Alternative, matte non-glare single-ply modified acrylic.
b. Base Material Color: Refer to sign type drawings.
c. Printed Graphics Fabrication Method: Direct to Substrate Flat Bed UV Printing Process
2. Sign Installation: Signs shall be mounted using double-sided vinyl foam tape (1/16” thickness) and silicon adhesive
3. Map Design: Sign Shop to design map graphics based on life safety plans provided by architect. Design shall be approved by architect and fire marshal.

2.4 ALUMINUM EXTERIOR SIGNS

A. Product: Aluminum Sign Panel

1. Sign Types: Refer to sign type in design drawings (FDC, BI)

a. Base Material: .080” Aluminum
b. Base Material Cladding Product: 3M Diamond Grad DG3 Reflective Vinyl Sheeting 4090 White
c. Paint Product: MAP® (Matthews Acrylic Polyurethane) UV resistant acrylic polyurethane paint
d. Paint finish: Satin sheen finish
e. Paint color: Refer to sign type drawings.
f. Printed Graphics on Vinyl Cladding Method: Direct to substrate flat bed UV printing Process.
g. Printed Graphics Color: Refer to sign type drawings.
2. Sign Installation: Signs shall be mounted using mechanical fasteners

2.5 VINYL MESSAGES ON GLASS

A. Product: 3M 7725/7125 Vinyl Series. (https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Scotchcal-ElectroCut-Graphic-Film-Series-7125/?N=5002385+3288743026&rt=rud)
1. Sign Types: Refer to sign type in design drawings (V01, V02, V03, V04, V05)
a. Application: Frist Surface Applied
b. Vinyl Graphics, Design Layout, Font, and Color: Refer to sign type in design drawings

2.5 EXTERIOR WAYFINDING

A. Product: Century Sign Builders, Monolith and Aluminum Post & Panel Sign System 3.25” Wide
1. Sign Types: Refer to sign type in design drawings (BLDG-ID, DRL1)
a. Overall sizes: Refer sign type drawings.
b. Sign Faces: .090” aluminum faces mounted flush to aluminum sign retainers with counter sunk screws.
c. Sign Frame: Constructed with aluminum angle, square tube, and extrustions.
d. Paint Product: MAP® (Matthews Acrylic Polyurethane) UV resistant acrylic polyurethane paint
e. Paint finish: Satin sheen finish
f. Paint color: Refer to sign type drawings.
g. Graphic message: Laser cut acrylic dimensional letters.
h. Graphic message Font, Font Size and Thickness: Refer sign type drawings.
2. Installation: Applicable footings to be included with stamped engineered drawings.

2.6 DIMENSIONAL ADDRESS NUMBERS

A. Product: Gemini Incorporated
B. Type: formed plastic
C. Numbers to be the font and size: Refer to design
D. Finish – refer to drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine signage for defects prior to installation. Do not install damaged signage.
B. Inspect conditions of installation areas and other conditions which may affect installation of signage to ensure that conditions are suitable for installation.
C. Do not begin installation until installation areas are within manufacturer's specified tolerances and have been prepared in accordance with manufacturer's instructions.
D. Sign installation must be by sign contractor and performed accordingly to engineered requirements.
E. Commencement of work is deemed as acceptance of installation conditions.

3.2 PREPARATION

A. Sign subcontractor is responsible for any field verification that is applicable.
B. Clean mounting locations of dirt, dust, grease, or similar conditions that would prevent proper installation.
C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
D. Verify completion of other installation conditions needed for sign installation including backing materials, reinforcement, electrical and data.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Locate signs in accordance with approved shop drawings and project requirements.

3.4 CLEANING, PROTECTION AND REPAIR

A. Protect installed products until completion of project.
B. If signage subcontractor is responsible for any damage - touch-up, repair or replace damaged products before Substantial Completion.

3.5 TRAINING & CLOSEOUT

A. Provide manufacturer’s written warranty and cleaning/maintenance instructions.
B. Provide digital templates for end-user updatable inserts.
C. Provide necessary tools and source for consumables for end-user updateable inserts.

END OF SECTION

SECTION 102113.17 - PHENOLIC-CORE TOILET COMPARTMENTS

1.1 SUMMARY

A. Phenolic-core toilet compartments configured as toilet enclosures and urinal screens.

1. Toilet-Enclosure Style: Floor and ceiling anchored.
2. Entrance-Screen Style: .
3. Urinal-Screen Style: Wall hung, flat panel .

1.2 SUSTAINABILITY REQUIREMENTS

A. :

1. Recycled content.

1.3 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: ASTM E84.

1. Flame-Spread Index: 75 or less.
2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

1.4 COMPONENTS

A. Door, Panel , Screen, and Pilaster Construction: Solid phenolic-core panel material with melamine facing on both sides , with no-sightline system.

B. Urinal-Screen Post: .

C. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets; stainless steel .
2. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel .

D. Phenolic-Panel Finish:

1. Facing Sheet Finish: One color and pattern in each room.
2. Color and Pattern: As selected by Architect from manufacturer's full range , with manufacturer's standard through-color core matching face sheet.
3. Edge Color: Through-color matching facing sheet color.

1.5 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Stainless steel finish.

B. Hardware and Accessories: Manufacturer's heavy-duty stainless steel operating hardware and accessories.

END OF SECTION 102113.17

SECTION 102600 - WALL AND DOOR PROTECTION

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Certified wood.
2. Low-emitting adhesives.
3. Low-emitting composite wood products.

1.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Class A.

B. Accessibility requirements of authority having jurisdiction.

1.3 PRODUCTS

A. Wall Guards:

1. Crash Rail: Plastic cover over .
   a. .
2. Bumper Rail: Plastic cover over retainer clips and PVC-free.
   a. Surface mounted .
3. Rub Rail: Plastic, .
4. Wood Chair Rail with Bumper: with finish; surface mounted; with plastic bumper.
5. Opaque-Plastic Chair Rail: .
6. Transparent-Plastic Chair Rail: Surface-mounted polycarbonate.
7. Rub Strip: Surface-mounted plastic.

B. Impact-Resistant Handrails:

1. Structural Performance: Uniform load of 50 lbf/ft. and concentrated load of 200 lbf, not applied concurrently.
2. Plastic, Impact-Resistant Handrails: profile.
3. Combination Wood-Plastic Bumper Handrail: with finish; with plastic bumper.
4. Wood Handrail with Bumper: with finish; with plastic bumper.

C. : .

D. Corner Guards:

1. Surface-Mounted, Plastic-Cover Type: high, using .
2. Flush-Mounted, Plastic-Cover Type: high, using .
3. Fire-Rated, Flush-Mounted, Plastic-Cover Type : .
4. Surface-Mounted, Opaque-Plastic Type: .
5. Surface-Mounted, Transparent-Plastic Type: Polycarbonate.
6. Surface-Mounted, Metal Type: Stainless steel .

E. End-Wall Guards:

1. Surface-Mounted, Plastic-Cover Type: high.
2. Flush-Mounted, Plastic-Cover Type: high.
3. Fire-Rated, Flush-Mounted, Plastic-Cover Type:
4. Surface-Mounted, Metal Type: Stainless steel .

F. Abuse-Resistant Wall Coverings:

1. Abuse-Resistant Sheet: Wainscot height.
2. Laminated, Impact-Resistant Wall Panels: Plastic sheet wall covering laminated to high-impact-resistant core; height.

G. Door Protection:

1. Protection Plates: Plastic armor kick plates.
2. Door-Edging: L- shaped plastic.
3. Door-Frame Protector: 48-inch- high, two-piece assembly of plastic with continuous retainer.
4. Door- Protector: Plastic.

END OF SECTION 102600

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

1.1 WARRANTY

A. Silver Spoilage for Mirrors: 15 years.

B. Toilet-Compartment Occupancy-Indicator System: Five years.

C. Hand Dryers: Five years.

1.2 PRODUCTS

A. Public-Use Washroom Accessories:

1. Toilet tissue (roll) dispenser.
2. Combination toilet tissue dispenser.
3. Toilet tissue (jumbo-roll) dispenser.
4. Paper towel (folded) dispenser.
5. Paper towel (roll) dispenser.
6. Automatic paper towel (roll) dispenser.
7. Waste receptacle.
8. Combination towel (folded) dispenser/waste receptacle.
9. Combination towel (roll) dispenser/waste receptacle.
10. Multipurpose soap/towel dispenser unit.
11. Soap dispenser.
12. Automatic soap dispenser.
13. Grab bar.
14. Sanitary-napkin and tampon vendor.
15. Sanitary-napkin disposal unit.
16. Seat-cover dispenser.
17. Purse shelf.
18. Mirror unit.
19. Hook.
20. Fixed height adult changing station.
21. Adjustable height adult changing station.

B. Toilet-compartment occupancy-indicator system.

C. Public-Use Shower Room Accessories:

1. Shower curtain rod.
2. Shower curtain.
3. Folding shower seat.
4. Soap dish.
5. Robe hook.

D.

1. Toilet tissue dispenser.
2. Shower curtain rod.
3. Folding shower seat.
4. Soap dish.
5. Medicine cabinet.
6. Facial tissue dispenser.
7. Robe hook.
8. Toothbrush and tumbler holder.
9. Towel bar.
10. Towel pin.
11. Towel ring.
12. Towel shelf.
13. Towel rack.
14. Retractable clothesline.

E.

1. Specimen pass-through cabinet.
2. Bedpan and urinal cabinet.
3. Bedpan rack.

F. Hand Dryers:

1. Warm-air dryer.
2. High-speed air dryer.
3. Multiple airflow hand dryer.

G. Childcare Accessories:

1. Diaper-changing station.
2. Diaper-changing station liner dispenser.
3. Diaper-pack vendor.
4. Child-protection seat.

H. Underlavatory guards.

I. Custodial Accessories:

1. Utility shelf.
2. Mop and broom holder.
3. Paper towel (folded) dispenser.
4. Paper towel (roll) dispenser.
5. Liquid-soap dispenser.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

1.1 PRODUCTS

A. Fire-Protection Cabinets:

1. Type: Fire extinguisher .
2. Cabinet Construction: NonratedandOne-hour fire rated .
3. Mounting: Semirecessed .
4. Door Style: Fully glazed panel with frame .
5. Door Glazing: Tempered break glass .
6. Accessories: Door lock .
7. Finish:
    a. Steel: .
    b. Aluminum: .
    c. Stainless Steel: ASTM A480/A480M No. 4 directional satin finish .
    d. Copper Alloy, Brass: .
    e. Copper Alloy, Bronze: .

B.

1. Type: Fire extinguisher .
2. Cabinet Construction: .
3. Mounting: .
4. Door Style: Solid opaque panel with frame.
5. Door Hardware: .
6. Finish: .

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Owner-Furnished Material: fire extinguishers.

1.2 WARRANTY

A. Materials and Workmanship: Six <**Insert number**> years.

1.3 PERFORMANCE REQUIREMENTS

A. Fire Extinguishers: Complying with NFPA 10 [**and approved, listed, and labeled by FM Global**].

1.4 PRODUCTS

A. Portable Hand-Carried Fire Extinguishers:

1. Stored-pressure water type.
2. Stored-pressure antifreeze water type.
3. Stored-pressure water-mist type.
4. Pressurized, AFFF-foam type.
5. Pressurized, FFFP-foam type.
6. Wet-chemical type.
7. Regular dry-chemical type.
8. Multipurpose dry-chemical type.
9. Purple-K dry-chemical type.
10. Carbon dioxide type.
11. Dry-powder type.
12. Halon type.
13. Clean-agent type HCFC Blend B TBD.

B. Mounting brackets.

C.

1. Pressurized, FFFP-foam type.
2.
3. .
4. .
5. .
6. .
7. .

END OF SECTION 104416

SECTION 105113 - METAL LOCKERS

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Recycled content.
2. Materials transparency declarations and certifications
3. Low-emitting composite wood products.

1.2 PRODUCTS

A. Knocked-Down Corridor Lockers:

1. Doors: 0.075-inch steel-sheet panels, vented.
2. Hinges: Continuous .
3. Door Handle and Latch: Projecting .
4. Locks: Combination padlocks .
5. Base: Legs with closed front and ends .
6. Tops: Continuous, sloping .
7. Ends: Finished end panels.
8. Two-tier lockers
9. Material: Steel sheet , metallic coated.

B. :

1. Doors: .
2. Hinges: .
3. Door Handle and Latch: Projecting .
4. Locks: .
5. Base: .
6. Tops: .
7. Ends: .
8. Material: Steel sheet.

C. Athletic Lockers:

1. Doors: .
2. Sides: .
3. Bottoms: .
4. Hinges: .
5. Door Handle and Latch: .
6. Locks: .
7. Base: .
8. Tops: .
9. Ends: .
10. Material: Steel sheet .

D. ,

1. Locker Arrangement: .
2. Sides: .
3. Bottoms: .
4. Tops: .
5. Ends: .
6. Material: Steel sheet .

E. Locker Benches:

1. Tops: Laminated hardwood .
2. Pedestals: Fixed, tubular steel .

F. Knocked-Down Construction: Assembled at Project site .

END OF SECTION 105113

SECTION 107516 - GROUND-SET FLAGPOLES

1.1 PERFORMANCE REQUIREMENTS

A. Basic Wind Speed: Special Wind conditions- 90+ .

B. Engineering design of flagpole by manufacturer.

1.2 PRODUCTS

A. Flagpoles:

1. Exposed Height: 25 feet .
2. Aluminum Flagpoles: Entasis tapered, with dark bronze anodic finish.
3. Copper-Alloy (Bronze) Flagpoles: Entasis tapered, with fine satin statuary conversion coating finish.
4. Stainless-Steel Flagpoles: Entasis tapered, with directional satin finish (No. 4).
5. Steel Flagpoles: , with finish.
6. Fiberglass Flagpoles: tapered, with gel coat or high-build polyurethane or polyester coating.

B. Mounting Type:

1. Foundation tube.
2. Sleeve for flagpole.
3. Cast-metal shoe base.
4. Hinged baseplate.
5. Pivoting tilt base.

C. Fittings:

1. Finial: BallorEagle.
2. Halyard: External with locking cleat cover and halyard cover.

END OF SECTION 107516

SECTION 122413 - ROLLER WINDOW SHADES

1.1 PRODUCTS

A. Manual, chain-and-clutch operating mechanism.

B. Roller Mounting Configuration: .

C. Installation Accessories: Front fascia Closure panel and wall clip .

D. Shadeband Materials: Complying with NFPA 701 .

1. Light-Filtering Fabric: Woven polyester and PVC-coated polyester .
2. Light-Blocking Fabric: Acrylic-coated fiberglass .

E. Product Safety Standard: WCMA A 100.1.

1.2 INSTALLATION

A. Between (inside) jamb installation.

B. Factory-authorized representative to train Owner's personnel to maintain motorized operators.

END OF SECTION 122413

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

1.1 SUSTAINABILITY REQUIREMENTS

A. :

1. Certified wood.
2. Low-emitting adhesives.
3. Low-emitting composite wood.

1.2 SOLID SURFACE MATERIAL COUNTERTOPS

A. Front: Bullnose .

B. Backsplash and End Splash : Eased edge.

C. Countertops: 3/4-inch- thick, solid surface material.

D. Countertops: thick, solid surface material laminated to particleboard.

E. Integral sinks.

1.3 INSTALLATION

A. Install on supports with adhesive.

END OF SECTION 123661.16

SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

1.1 COMPONENTS

A. Roll-up, Aluminum-Rail Hinged Mats: Continuous vinyl cushions.

1. Tread Inserts: .

B. Roll-up, Vinyl-Rail Hinged Mats: Slotted or perforated hinges.

1. Tread Inserts: .

C. Resilient Link Mats: link mats with -steel wire link rods.

D. Rubber Mats: Beveled edges for surface applications.

E. Cocoa Mats: PVC backing.

F. Rubber-Tire Mats: Continuous linear strip.

G. Carpet-Type Mats: Polyester.

H. Loop Filament Mats: sheet backing.

I. Rubber-Tire Tiles: tiles.

J. tiles.

K. Carpet-Type Tiles: carpet with nonraveling edges.

L. Recessed Frames: .

M. Surface-Mounted Frames: Tapered .

N. Aluminum Frame Finish: .

END OF SECTION 124813