

CDB PROJECT 040-010-115

CONSTRUCT

NEW NURSING HOME AND DOMICILIARY

FOR

THE ILLINOIS DEPARTMENT OF VETERANS' AFFAIRS
ILLINOIS VETERANS' HOME AT QUINCY, ADAMS COUNTY

BRIDGING DOCUMENTS— VOLUME 01
NOVEMBER 11, 2019

1707 N. 12TH STREET
QUINCY, IL 62301

**PERKINS
— EASTMAN**

209 S. LASALLE STREET, SUITE 400
CHICAGO, IL 60604

PERKINS EASTMAN # 77550.00

State of Illinois
CAPITAL DEVELOPMENT BOARD

Perkins Eastman
209 S. LaSalle St., Suite 400
Chicago, IL 60604

PROJECT MANUAL FOR

CDB 040-010-115

New Nursing Home and Domiciliary
Illinois Veterans' Home, Quincy
Department of Veteran Affairs
Quincy, Adams County, Illinois

DATE: November 11, 2019

The following listed documents comprise the project manual for the project listed above. Where numerical sequence of sections is interrupted, such interruptions are intentional.

The complete Project Manual for this project consists of the listed Volume(s), which must not be separated for any reason. The Architect and Owner disclaim any responsibility for any assumptions made by a contractor or subcontractor who does not receive a complete Project Manual, including all sections listed in the Table of Contents.

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VOLUME 3

Geotechnical Report	89 pages
Environmental Phase I Site Assessment Report	1062 pages
Environmental Phase II Site Assessment Report	420 pages

SPECIFIER: General: Perkins Eastman
 209 South LaSalle Street, Suite 400
 Chicago, IL 60604

END 00 01 10.

END 00 01 10.

BIDDING & CONTRACT REQUIREMENTS
00 11 13 – Advertisement for Bids

The State of Illinois, Capital Development Board (CDB) will receive sealed bids for:

CDB PROJECT #: 040-010-115
TITLE: New Nursing Home and Domiciliary
LOCATION: Quincy, IL
USING AGENCY: Department of Veteran Affairs
COUNTY: Quincy, Adams County, Illinois

PROJECT DESCRIPTION: Project include the construction of a new long-term care facility, a new domiciliary, and renovations to various structures on the campus. Buildings will be of a bird friendly design.

Single Prime Delivery Method:

Either the Single Prime Bidder or a protected subcontractor must be listed for each trade provided on the Bid Form. Only one protected subcontractor may be listed for each trade. Failure to identify the name and bid proposal cost of each listed protected subcontractor on the provided Bid Form or providing more than one protected subcontractor for each trade will be a material deficiency (no time will be allowed after bid opening to remedy deficiency) and will result in the rejection of the bid. All protected subcontractors listed must be prequalified with CDB in accordance with CDB Standard Documents for Construction, Article 00 21 05.

<u>TRADE</u>	<u>COST RANGE</u> (*see below)	<u>BID DATE/TIME</u>
GENERAL	under \$ _____	(*MO/DAY/YR)(*am/pm)
PLUMBING	under \$ _____	(*MO/DAY/YR)(*am/pm)
HEATING	under \$ _____	(*MO/DAY/YR)(*am/pm)
VENTILATION	under \$ _____	(*MO/DAY/YR)(*am/pm)
ELECTRICAL	under \$ _____	(*MO/DAY/YR)(*am/pm)
ASBESTOS ABATEMENT	under \$ _____	(*MO/DAY/YR)(*am/pm)
(*OTHER)	under \$ _____	(*MO/DAY/YR)(*am/pm)

BID LOCATION:

ILLINOIS CAPITAL DEVELOPMENT BOARD
401 SOUTH SPRING STREET
THIRD FLOOR, WILLIAM G. STRATTON
BUILDING
SPRINGFIELD, IL 62706
BID MODIFICATION FAX NO. (217) 782-4938

Minority, Female & Veteran Business Subcontractor/Supplier Participation is (*Applicable)(*Not applicable)

Obtain Plans From: (*A/E FIRM NAME, ADDRESS, PHONE)

Refundable Plan Deposit:(*\$)

Pre-Bid Meeting (*Not Mandatory*): (*date, time, location)
(Mandatory Pre-Bid Meeting For All Prime Bidders:) (*date, time, location) (*A/E consult PM,
Mandatory Pre-bid Justification required) (*Justification, please select all that apply: A mandatory pre-bid meeting is required due to;(1) the unique nature of this project; (2) the complexity of this project; (3) unique site features; (4) the size and scope of the project; (5) restricted access to the job site; (6) being an emergency project. Brief Explanation:.)

BIDDING & CONTRACT REQUIREMENTS
00 11 13 – Advertisement for Bids

INFORMATION TO BIDDERS:

- A. Prequalification. Bidders and protected subcontractors must be prequalified with CDB; allow 45 days for application processing. For an application and a copy of CDB's Standard Documents for Construction (applicable to this project), visit CDB's Website www.illinois.gov/cdb or phone 217/782-6152 (TDD 217/524-4449).
- B. MBE/FBE/VBE. MBE/FBE/VBE firms must be certified or registered with CMS as an MBE, FBE, or VBE prior to bidding.
- C. Prevailing Wage. Contractor shall not pay less than the prevailing rates of wages to all laborers, workmen, and mechanics performing work under this contract, and shall comply with the requirements of the Illinois Wages of Employees on Public Works Act(820 ILCS 130/1-12).
- D. Registration with the Illinois Procurement Gateway (IPG). Vendors may pre-register with the IPG and receive a vendor registration number. The IPG is a web based system that serves as the primary location for entering, organizing, and reviewing vendor information. The IPG allows prospective vendors to provide disclosures, registrations, and other documentation needed to do business with the State in advance of any particular procurement. Registration in the Illinois Procurement Gateway is optional.
- E. Certifications and Disclosures. Vendors must have an approved Illinois Procurement Gateway registration number and completed Form B, or submit the Standard Certifications and Disclosure Form(s) (Form A) with bid at time of submittal. Failure to provide a completed Form A standard certifications and financial disclosure or Form B, be registered with the Illinois Procurement Gateway, will result in rejection of bid.
- F. Subcontractors. You are also required to submit disclosure forms and standard certifications for subcontractors not considered incidental to the performance of the contract with an annual value over \$50,000 within 20 days of execution of your contract with CDB or execution of the contract between you and your subcontractor, whichever is later. A valid IPG registration number can be provided in lieu of hard copies of the standard certifications and financial disclosure forms. (See D. above.) Subcontractors must receive an Authorization to Proceed prior to performance of any work.
- G. Supplement to SDC. Bidders are advised to review Article 01 11 01, Supplement to SDC, for any revisions to the Standard Documents for Construction.
- H. Progress Payments. Progress payments will normally be issued by the Illinois Comptroller within 30 business days after CDB receives and approves an Invoice-Voucher.
- I. For Single Prime Delivery Method Projects: Any reference in the Specifications and the Drawings for Multiple Prime Trades shall be considered as the Prime Bidding Trade.
- J. Bid Protest. Bidder may submit a written protest to the Protest Review Office following the requirements of the Administrative Rules, 44 Ill. Adm. Code 8.2075. For protests related to specifications, the Protest Review Office must physically receive the protest no later than fourteen (14) days after solicitation or related addendum was posted to the Bulletin. For protest related to rejection of individual bids or awards, the protest must be received by close of business no later than fourteen (14) days after the protesting party knows or should have known of the facts giving rise to the protest. To reach the Protest Review Office:

Chief Procurement Office
Attn: Protest Review Office
401 South Spring Street
Suite 515 Stratton Office Building
Springfield, IL 62706

Phone: (217) 558-1393
Facsimile: (217) 558-1399
Illinois Relay: (800) 526-0844

CAPITAL DEVELOPMENT BOARD

Jim Underwood
Executive Director

(*Name)
Project Manager
(*Area Code & Phone Number, e-mail address)

1. GENERAL

1.1 SUMMARY

- A. This document summarizes information available to Bidders, in addition to contract documents, including:
1. Executive Summary
 2. Phasing Diagrams
 3. No Deviations, Betterments and Sole Source List
 4. Owner Project Requirements
 5. Architectural Narrative
 6. Concept FF & E Narrative
 7. FFE Budget
 8. Structural Narrative
 9. Central Commercial Laundry Narrative
 10. Domiciliary Serving Kitchen Foodservice Narrative
 11. Central Kitchen Foodservice Narrative
 12. Household Service Kitchen Foodservice Narrative
 13. Pub/Café Foodservice Narrative
 14. Quincy Electrical Narrative
 15. Civil Narrative
 16. Landscape Narrative
 17. Site Lighting Narrative
 18. Landscape Outline Specifications
 19. Environmental Narrative
- B. The Bridging Documents architectural and engineering team have viewed and analyzed existing conditions on campus and utilized knowledge gained through leadership meetings, staff interviews, Federal and State regulatory agency pre-reviews and considered long-term durability, maintenance and life-cycle performance and life cycle cost analysis when establishing the Bridging Documents.
- C. These deliberations, in consultation with the Using Agency and the Capital Development Board, have informed the design. These drawings have been coordinated as best possible with the architectural work and engineering disciplines as appropriate for this limited stage of design.
- D. These documents are not to be considered representative of the only solution for the Design-Build work, nor are they to be considered fully complete or accurate, and representative of what is needed to design and construct the project; it is fully the responsibility of the Design-Build team to provide all engineering design and construction phase services to meet the codes and standards stated, all applicable codes and standards for design and construction in Illinois. Further, they shall meet all requirements to allow the Illinois Department of Veterans' Affairs (IDVA) to make federal reimbursement submissions to the United States Department of Veterans' Affairs (USDVA)
- E. The Bridging Documents architectural and engineering teams will remain available for general consultation as approved or authorized by the CDB, but all design and design related decisions shall be the responsibility of the Design-Build team.

F. Verify data and existing conditions. At Contractor's option, perform additional investigations at own expense.

G. Related Requirements:

1. Concealed Conditions: General and Supplementary Conditions.

2. PRODUCTS (NOT USED)

3. EXECUTION (NOT USED)

END 00 31 00

Executive Summary

The State of Illinois's Capital Development Board ('CDB') commissioned Perkins Eastman in December 2018 to develop the plans for a new Long Term Care Building and Domiciliary for the Illinois Department of Veterans Affairs. The site chosen for this development lay at the heart of the campus of the Illinois Veteran's Home in Quincy in Adams County, Illinois.

Perkins Eastman's planning for the campus was inspired by the rich history of the campus overlaid with a robust site and functional program analysis. The programming was informed by clear leadership vision and also interviews with the staff that are directly involved in the care for our veterans and the operation of the campus. The design of this Center of Excellence took shape over the last several months and helped deepen and extend the Master Planning effort completed earlier.

The infrastructural foundations for this vision needed a team of engineers and design professionals that brought a deep knowledge of both the operating campus and its current and future needs. Perkins Eastman entrusted this campus-wide assessment of civil, structural, mechanical, electrical, plumbing, fire-protection and technology infrastructure to a team of experts with a vision to creating a Campus of the Future. Apart from the engineers above, the team also included landscape architects, dietary and food service consultants, geotechnical and environmental consultants, historic preservationists, specification and cost consultants.

The team was expected to help create 'Bridging Documents' that would be handed to a team of Design-Builders ('D-B') chosen by the State's selection committee to complete the design and construction activities in a phased manner over a period of four to five years.

Bridging Documents can be generally defined as a set of architectural and engineering drawings and narratives, of sufficient clarity to enable the Design-Builder teams to assess scope, develop design, assign costs, and arrive at plans for execution.

To enable a smooth process of execution, it was crucial for a Bridging Process to obtain input from the many partner State and Federal agencies involved in the project's success. While the Illinois Department of Veterans' Affairs ('IDVA') is the primary Using Agency that helped guide the overall program and design direction with the CDB's management guidance, input on requirements and acceptance of design direction was also obtained from the following agencies:

- The Capital Development Board of the State of Illinois ('CDB'), which provides overall management of the project and guidance on minimum design and construction standards. It provides periodic multi-disciplinary reviews at drawing document milestones and also helps administer the Art in Architecture program for the project.
- The CDB also oversees the sustainable goals for the project established as meeting the minimum SILVER standard of the U.S. Green Building Council's LEED program (Leadership in Energy and Environmental Design). The design team's efforts have targeted the achievement of a LEED GOLD level or higher with special attention paid to factors that enhance the indoor environmental, air, and water quality.
- The U.S. Department of Veterans Affairs ('USDVA'), which helps establish minimum standards that support a partial reimbursement of project costs. It also establishes recommended guidelines and best practices for Small House design.

- The Illinois Department of Public Health ('IDPH') Division of Long Term Care, whose staff will be inspecting and approving the Long-Term-Care ('LTC') building project for licensure in the State as a Skilled Nursing Facility.
- Illinois Department of Public Health's Division of Environmental Health ('IDPH Env. Health') which oversees the Plumbing and Water Quality Program, and which sets the standards for plumbing water distribution and the plumbing and environmental health issues impacting the design of the central and distributed cooking and serving kitchens.
- The Illinois Department of Innovation and Technology ('DOIT'), which sets the standards and approves the design direction for Technology, which generally includes Communication, Audio-Visual, Security, Nurse-Call and Wander Management plans.
- The Illinois Department of Natural Resources ('IDNR') and its State Historic Preservation Office ('SHPO'), which guide the response to the historic campus context including campus character and overall building scale, exterior form and materiality.
- The Quincy Fire Department ('FPD'), which requires approval of the Fire Prevention strategy including access and emergency response.

In each case above, the project planning and design has been taken through a preliminary approval phase. Subsequent design development and approval of plans for construction shall be the responsibility of the Design-Builder ('D-B').

Campus resilience has remained an important design driver at all levels of infrastructure and building design. This resilience is gained from using renewable and or redundant sources of energy, redundant access and connectivity to utilities, back-up plans for mechanical heating and ventilation capacity for emergency preparedness and a the use of a minimal maintenance super-insulated building envelope that helps mitigate unpredictable or extreme weather events.

Campus-wide and building specific, Perkins Eastman had embraced the opportunity to create a platform for a comprehensive and coordinated campus design effort that would support the creation of a Center of Excellence for the care of our veterans.

The Mission Statement of the Illinois Veterans' Home Quincy

"The Illinois Veterans' Home in Quincy is responsible for providing economical and quality Long Term Care for veterans and their spouses which includes domiciliary care, intermediate care, and skilled care. These services are provided by a multi-disciplinary group of health care professionals as well as an array of supportive staff. These services are directed to provide multiple physical services as well as restorative services to maintain maximum functioning capacity."

The underlying purpose of the Bridging Documents are to support the Mission Statement of the Illinois Veterans Home in Quincy.

Transforming the campus through excellence in design

The following principles reflect the key design goals for the design team.

The following goals were established for the project and guided all design decision making:

- Creating a **center of excellence** for our veterans, where resident care will be enhanced greatly in a new supportive environment.
- Promoting **resident focused design**, with emphasis on a home-like environment, amenities to build a sense of community, enhanced culinary experience, and life-long learning.
- **Celebrating history**, by creating the heart of the campus through cohesive site planning and landscape enhancement.

- Supporting the **future of the campus** through comprehensive infrastructure upgrade and smart technology.
- Basing the design on **staffing & operational efficiencies** gained through a deep engagement with leadership and staff across all divisions.
- Providing the **timeless architectural design** that is inspired by the surrounding historic contexts, materiality, and scale between mature trees and historic characteristics on campus.

High-performance design with a focus on wellness of the residents

Integrating sustainability into every step of the design and decision making process is a primary driver in this transformation. Not only do the high-performance design goals aim to reduce the campus-wide energy use, but they also draw attention to the central focus on creating a healthy and comfortable environment for residents and staff.

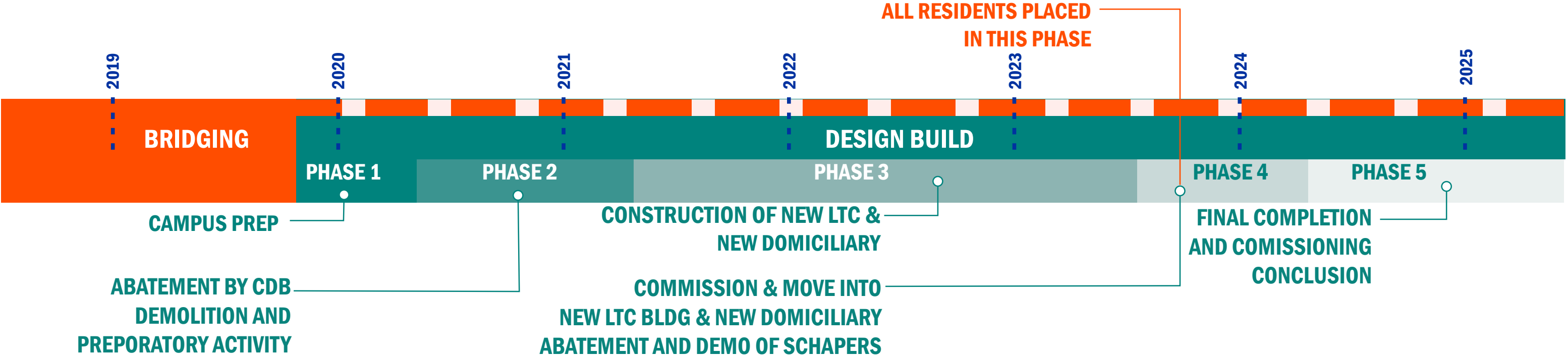
The followings are key considerations as the Design Builders are brought in to realize the visions set out by the design team and the Using Agency.

- Expanding the **focus on wellness** by creating healthy environment and promote active lifestyle through design and infrastructure. Access to Nature, Daylight, and biophilic principles employed to promote healthy living
- Balancing the Social, Environmental, and Economic factors
- Planning for **campus resilience**: Using renewable and or redundant sources of energy, redundant access and connectivity to utilities, back-up plans for mechanical heating and ventilation capacity for emergency preparedness.
- **Life-cycle analysis and durability** of materials and system choices to assist the Using Agency to make informed decisions
- **Third Party Verification** through LEED as well as commissioning not only confirms that the selected design strategies have been actually employed in the final construction, but also demonstrates the State's and VA's commitment to the environments.

Further sustainable design strategies are provided in detail under Architectural, Mechanical, and Electrical Narrative sections.

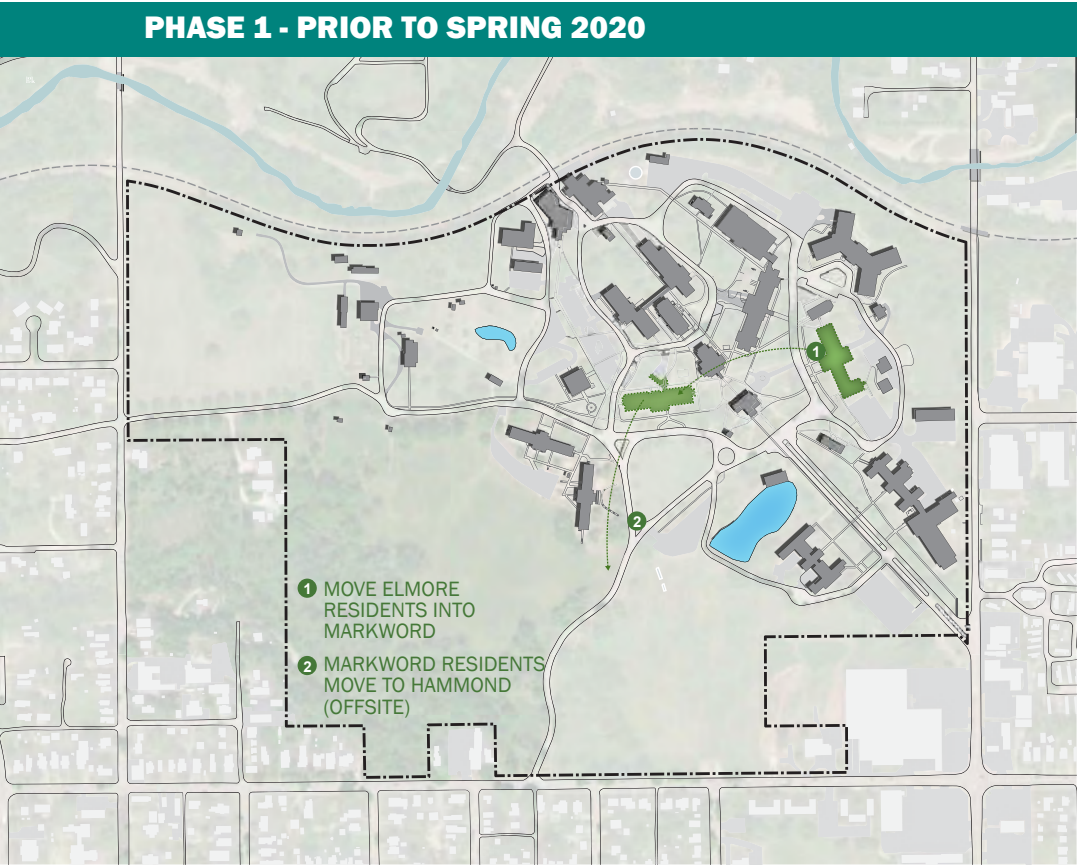
PHASING OVERALL SCHEDULE

ALL PHASING AND SCHEDULING MILESTONES ARE PRELIMINARY
AND SHALL BE FINALIZED BY THE DESIGN-BUILDER



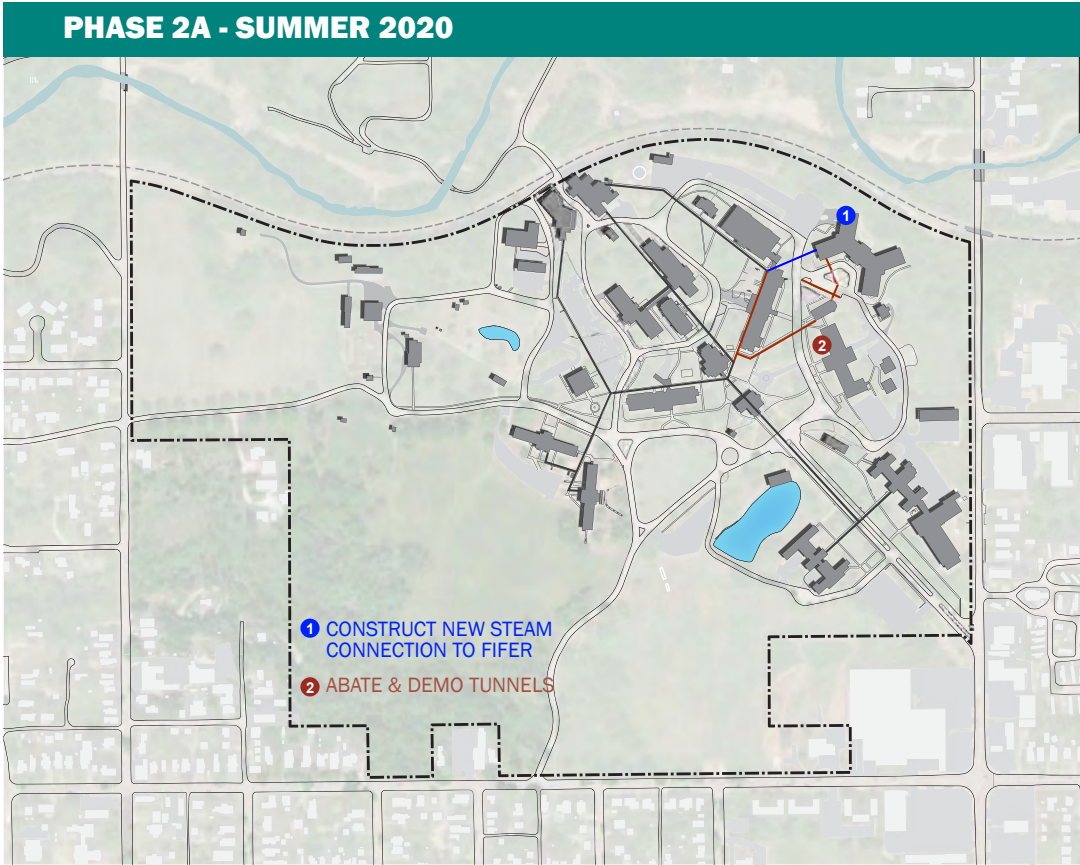
PHASING PLAN

ALL PHASING AND SCHEDULING MILESTONES ARE PRELIMINARY
AND SHALL BE FINALIZED BY THE DESIGN-BUILDER



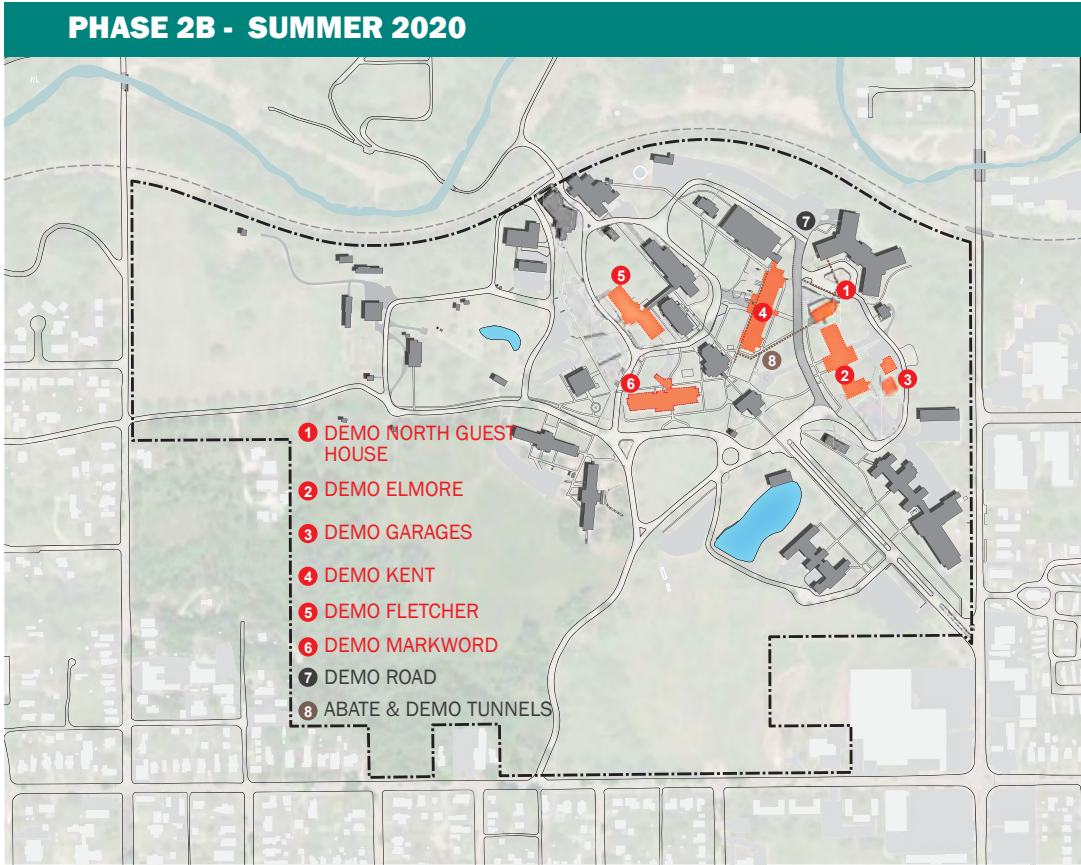
CAMPUS PREP

- IDVA/IVHQ PREP
- RESIDENT MOVES PRIOR TO DESIGN BUILD TEAM’S CONSTRUCTION START
- BUILDING ABATEMENT BY CDB



DESIGN/BUILDER ON BOARD

- MOBILIZATION
- START DESIGN DRAWINGS
- OBTAIN EPA PERMITS
- ESTABLISH TEMP. UTILITY CONNECTIONS



DEMOLITION

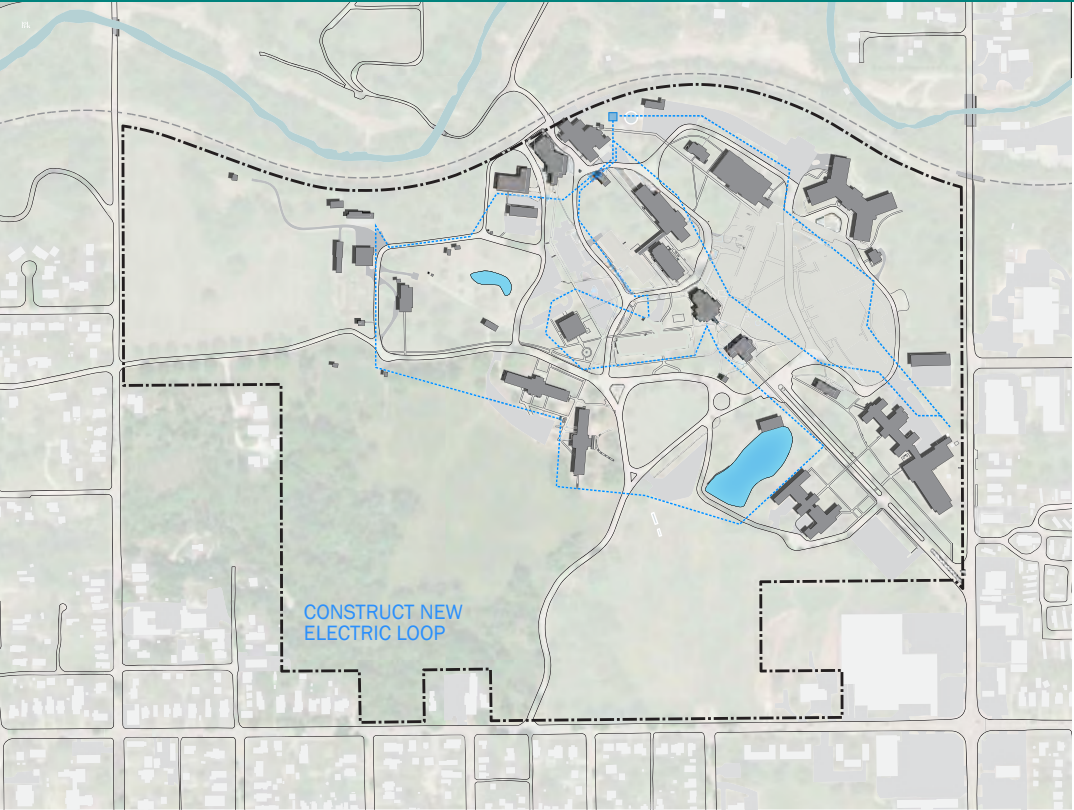
- DEMO AND PREP OF TUNNELS
- COORDINATE AND MAINTAIN CONTINUITY OF CAMPUS UTILITIES THOUGHOUT DEMO
- DEMO BUILDINGS & ROADS
- CAP-OFF UTILITIES.
- WATER DISTRIBUTION COORDINATION



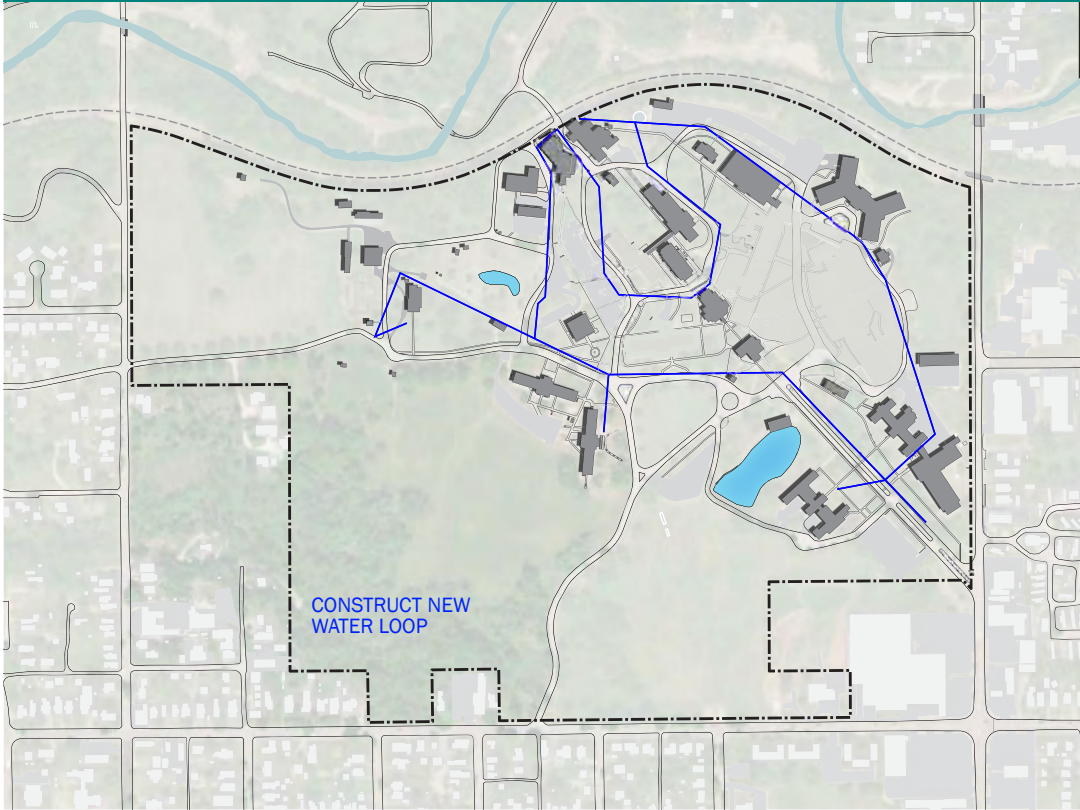
PHASING PLAN

ALL PHASING AND SCHEDULING MILESTONES ARE PRELIMINARY
AND SHALL BE FINALIZED BY THE DESIGN-BUILDER

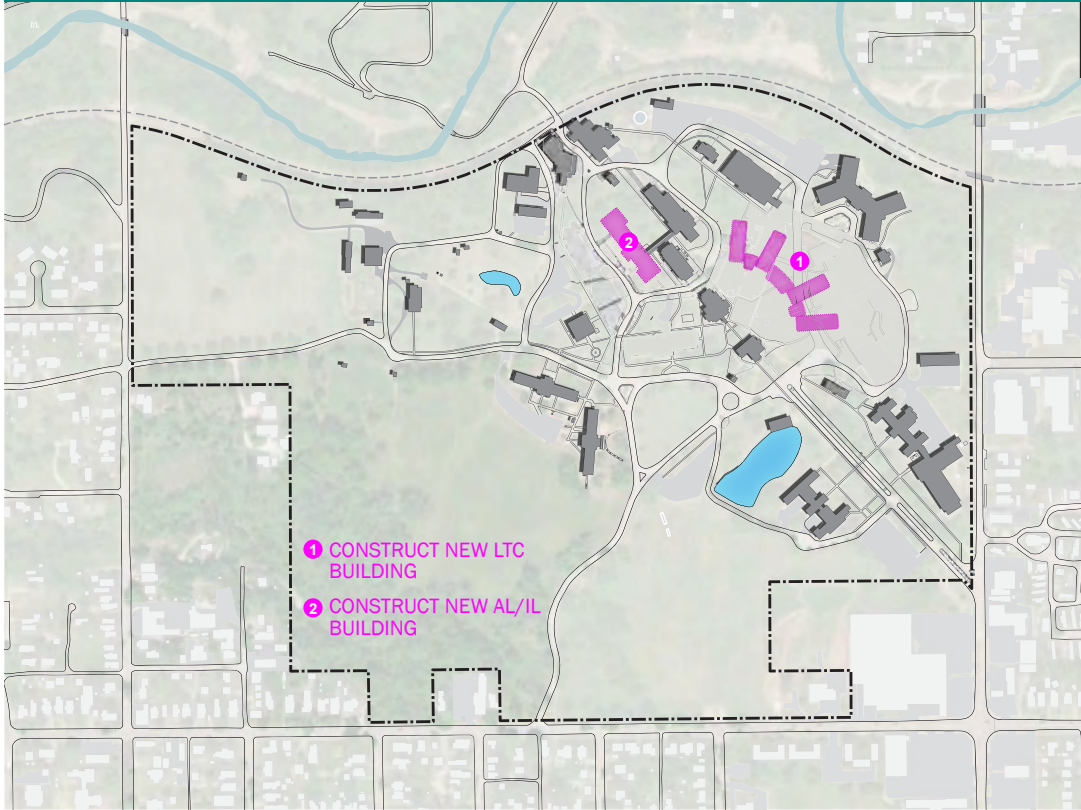
PHASE 2C - FALL 2020 - SPRING 2021



PHASE 2D - SPRING - SUMMER 2021



PHASE 3 - SPRING - SUMMER 2021 OR EARLIER



ELECTRICAL DISTRIBUTION

- MAIN SWITCHGEAR UPGRADES
- SITE & CIVIL EARTHWORK PREP
- BUILDING PAD PREP
- COORDINATE AND PREP FOR ELECTRICAL UPGRADE

WATER DISTRIBUTION DIAGRAM

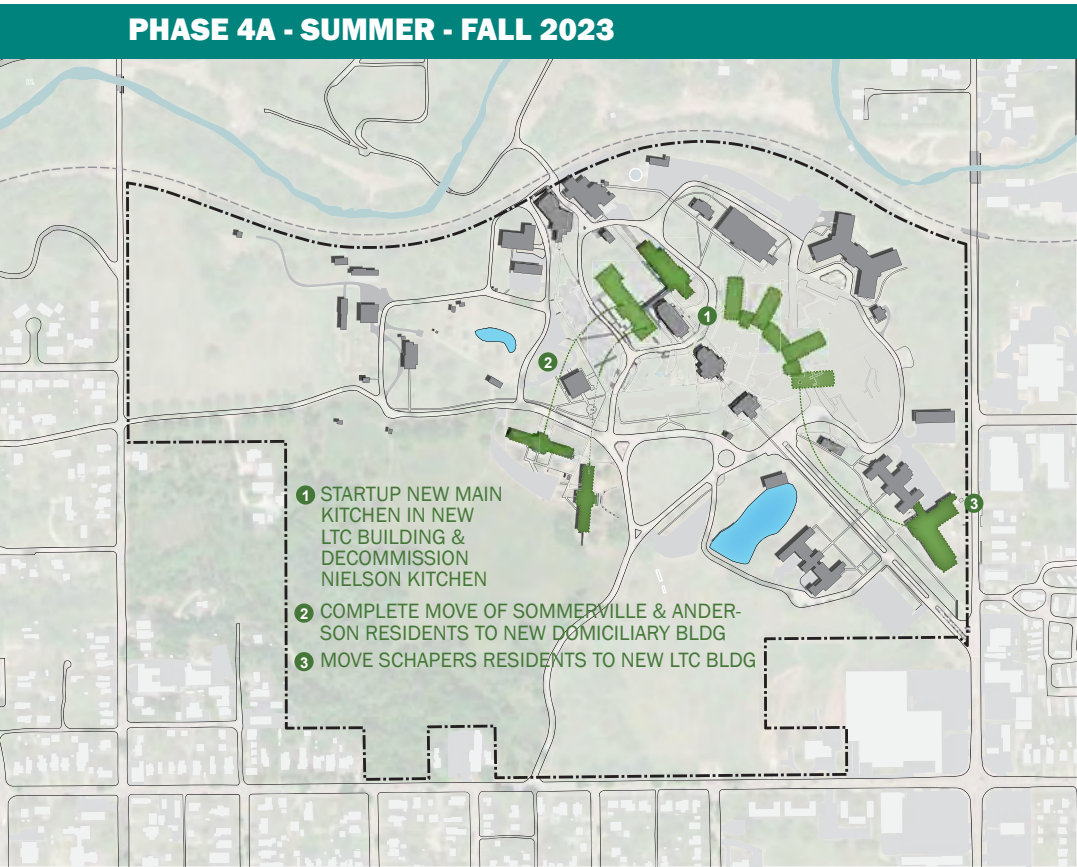
- MAY START CONSTRUCTION IN 2019/2020
- COORDINATE WITH CDB

CONSTRUCTION START

- NEW LONG TERM CARE BUILDING CONSTRUCTION
- NEW DOMICILIARY CONSTRUCTION
- LINKS AND CONNECTORS
- ELECTRICAL & MECHANICAL FEEDS
- CENTRAL PLANT / DECENTRALIZE

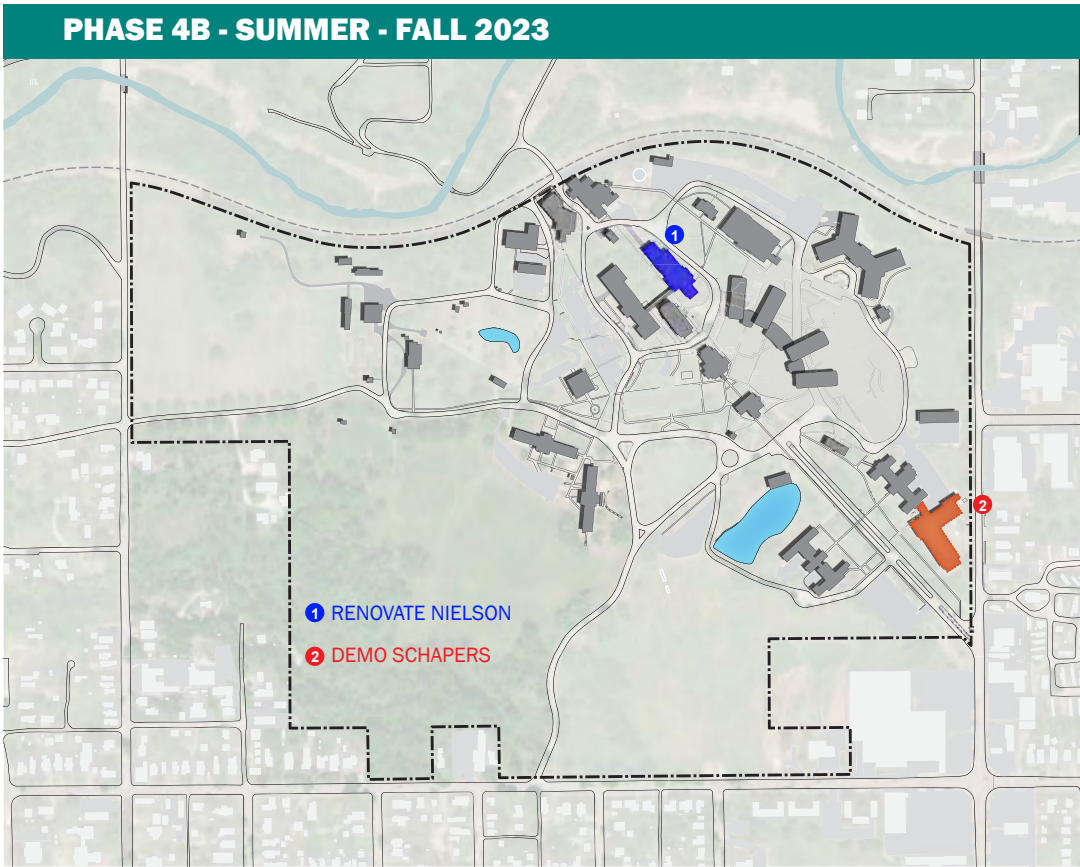
PHASING PLAN

ALL PHASING AND SCHEDULING MILESTONES ARE PRELIMINARY
AND SHALL BE FINALIZED BY THE DESIGN-BUILDER



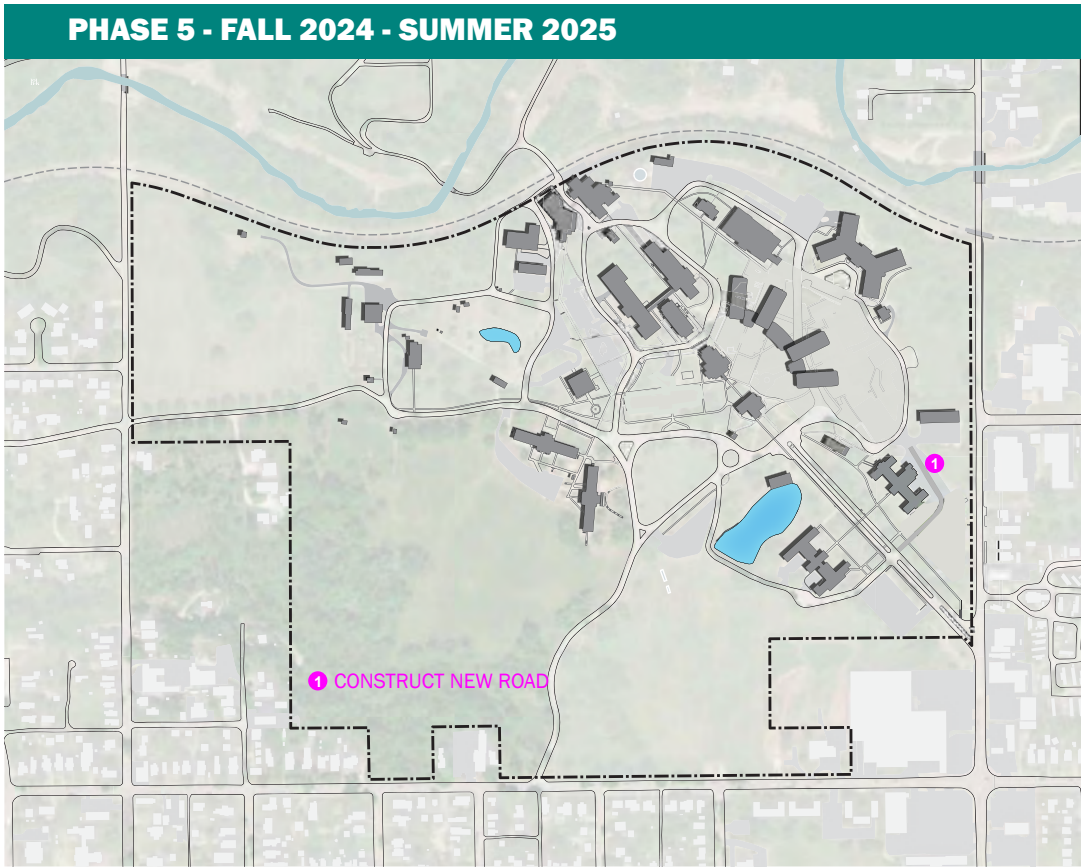
CONSTRUCTION END / ALL RESIDENT MOVE IN

- COMPLETION OF NEW LONG TERM CARE BUILDING
- COMPLETION OF NEW DOMICILIARY BUILDING
- START OF NIELSON RENOVATIONS
- COMMISSIONING
- START-UP FOR NEW BUILDING SYSTEMS AND SERVICES
- PREP SCHAPERS FOR DEMO



RENOVATION / DEMO START

- DEMO SCHAPERS
- NIELSON - ABATEMENT, WATER UPGRADES, RENOVATION



FINAL SITE CONSTRUCTION

- FINAL ROAD CONNECTOR
- FINAL UTILITY LOOP CONNECTIONS
- ALL BUILDING CONSTRUCTION COULD BE COMPLETED SOONER.
- **ALL MOVE-INS AND ALL WORK ON SITE TO BE COMPLETED BY SUMMER 2025**

Legend

USDVA - United States Department of Veterans' Affairs	IDNR-SHPO Historic Preservation Office (IL Dept of Nat. Resources)
IDVA - Illinois Department of Veterans' Affairs	LTC - New Long-Term Care building
IDPH - Illinois Department of Public Health	DOM - New Domiciliary building
DOIT - Illinois Department of Innovation and Technology	D-B - Design builder

S. No.	AREA	NO DEVIATIONS	REASONING BEHIND NO DEVIATIONS
The systems and descriptions below are not to be deviated from unless otherwise proposed in writing and approved by the CDB.			
ND-1	LTC architecture	Resident centered design: Residential look and feel to the design and details within the resident units. The Using Agency wishes to avoid an institutional, hospital like setting in the design, details and materiality. While details and materials are of commercial grades, code compliant, and support long-term durability, they shall be designed with a home like environment as a design	Compliance with the intent behind the USDVA Small House Model Design Guide, and IDVA's pursuit of industry best practices for Small House design.
ND-2	LTC architecture	Overall household layout to support resident centered design - general sizing of spaces and strategies to break down the visual length of corridors using wall and ceiling geometries.	Non-institutional, residential and intimate interior spaces. Space guidelines from the USDVA and prior approvals from USDVA, IDVA, IDPH.
ND-3	LTC architecture	Size of household: 15 beds per household, 30 beds per neighborhood in the LTC building.	Effective and optimal staffing and operational efficiencies on all shifts. Prior approval for initial design from USDVA and IDPH.
ND-4	LTC architecture	Design strategies to support long-term care for veteran residents including increased wheel-chair turning radius per enlarged plans, designated space to park electric wheelchairs, provision of barn doors for bathroom access, ceiling coordination for integrated track for ceiling lift and barn door, nurse-server cabinets for supplies, 'picture/light shelf' providing a memory rail and lighting source on the head wall. Design to meet and exceed codes.	Input from USDVA guidelines, staffing meetings, industry best practices and Using Agency feedback.
ND-5	LTC architecture	Minimize the prominence of the nurse station within the household.	Small House design guidelines, USDVA requirement.
ND-6	LTC architecture	Construction type: Type 1A (IBC) with CMU back-up on exterior wall construction where indicated, interior non-combustible walls, partitions, ceilings, structure and general construction.	Longevity, durability and thermal mass. Fire and life safety advantages. Flexibility in future uses and operations. Avoid fire walls and construction, maintenance issues.
ND-7	LTC architecture	LTC Resident Rooms - Suspended ceilings.	Intent to allow for air distribution at windows for thermal comfort.
ND-8	LTC architecture	LTC resident rooms - Uniform high level of accessibility in all unit bathrooms.	Universal and accessible designs as adopted on campus.
ND-9	DOM architecture	Domiciliary - Type IIA (IBC) Construction type, non-combustible construction as a minimum standard.	Future flexibility in uses and operations; required to accommodate changes to Domiciliary reimbursements per USDVA. Increased fire and life-safety for residents.
ND-10	DOM architecture	Domiciliary - Uniform high level of accessibility in all unit bathrooms.	Universal and accessible designs as adopted on campus.
ND-11	DOM architecture	Minimum of two smoke compartments on each floor of the Domiciliary (actual location of smoke-barrier wall and its geometry and location are flexible per D-	Increased fire and life safety.
ND-12	Site, geometry	General site and building layout geometries, LTC major building axes and gridline geometries.	Provide some open space and landscaped areas around the historic core of the campus. Provide for open space balance and respect for historic context per input from SHPO.
ND-13	Site, geometry	Wide fire lane pedestrian path (per site plan drawings) around campus historic core, to the south and west of LTC.	Fire access to campus core and older buildings, easier circulation for residents, prior discussion and approvals from Quincy Fire Department.
ND-14	Site, geometry	Delayed egress hardware and access control at doors to household, gate at memory care courtyard, and access control at utility and secure rooms at household.	Flexibility in current and future operations.
ND-15	Site, geometry	Tunnel connections to Nielson and Therapy and Fifer building - (Geometry and routing is flexible per D-B design).	Campus operational efficiency, food service and trash management.
ND-16	Sustainability	Building EUI targets. See architectural sustainability narrative.	Sustainable long-term campus operations. Helps target well insulated building envelope, shading strategies, right sizing of mechanical equipment.
ND-17	Sustainability	Sun shading strategies on building fenestration, window to wall ratios as indicated for each façade, and major material designation per each façade.	Minimize energy loss, aid resident comfort, correlation with mechanical design strategies, fit into site's historical and
ND-18	Sustainability	LEED Checklist - All IEQ points (Indoor Environmental Quality).	Indoor environmental quality is a long term focus of the project.
ND-19	Sustainability	WELL rating system - Legionella Prerequisite #W03, also as supported by water quality requirements in plumbing narratives.	Indoor environmental quality is a long term focus of the project.
ND-20	Structural	Concrete structural frame on LTC building.	Long term durability, fire resistance, ease of installation of connections between rated members.
ND-21	Structural	Slope the roof deck structure on the flat roofs to achieve the flat-roof minimum drainage slopes required.	Cost saving, sustainability. Helps prevent excessive use of tapered insulation.
ND-22	Civil	Provide a proportion of parking area to planting/landscape area - 85:15 or better to ensure the landscape islands are big enough for achieving the LEED points related to on site water management.	Campus sustainability and LEED credits.
ND-23	Civil	Concrete roadway surface on all new campus roads and immediate access parking lots as indicated on site plans.	Longevity, durability, low life-cycle costs, ease of maintenance.

ND-24	Mechanical, Electrical, and Plumbing	Redundancy - (N+1) of mechanical equipment, electrical points of supply, utilities per drawings and narratives. N+1 Redundancy for chillers, boilers and related distribution pumps.	Redundancy and campus emergency management; adherence to guidance from ILDVA and federal documents
ND-25	Mechanical	Mix of water-based and all-air HVAC system as per Mechanical narrative and drawings.	Redundancy and campus emergency management; flexibility during extreme weather emergencies; adherence to guidance from ILDVA and federal documents.
ND-26	Mechanical	Existing water-based cooling tower at Multi-Therapy must be removed.	Eliminate a common source for bacterial development.
ND-27	Mechanical	Water based heat rejection is not allowed.	Eliminate a common source for bacterial development.
ND-28	Mechanical	The steam distribution phasing plan depicted in the narrative is not meant to dictate the sequence of demolition, new construction, or renovation; it is a preliminary plan, although it has been discussed with and approved by the Using Agency. The final sequencing plan is the responsibility of the Design Build Entity; it also must be discussed with and approved by the Using Agency; No deviation allowed.	Maintain campus operations during construction and ensuring utility connectivity is maintained during the construction period.
ND-29	Mechanical, plumbing	Ohmeda-style gas outlets at resident room headwalls to assist in the consistency of type of fittings across campus. Multiple manufacturers are	This matches existing systems on campus. Recessed fittings are preferred. Expected to ease staff operations during emergencies.
ND-30	Plumbing, Dietary	General layout of household kitchens, plumbing distribution and kitchen equipment quality.	Prior approvals with IDPH Health and Water Quality program, review of operations with USDVA and IDVA staff for operational efficiency.
ND-31	Plumbing	Domestic water, service entrance, in-Line filtration system in LTC Nursing Home and Domiciliary.	Proven effectiveness of filtration.
ND-32	Plumbing	Water monitoring system in LTC Nursing Home and Domiciliary	Maintain consistency with existing water management.
ND-33	Plumbing	Domestic water piping approach in resident rooms in Nursing Home, Domiciliary and renovated Nielson buildings; refer Sheets L-P201 Typical Resident Room Unit Domestic Water Plan (Nursing Home) and D-P201 Typical Resident Room Unit Domestic Water Plan (Domiciliary). Piping for Nielson shall follow same approach. Utilize identical approach for all plumbing fixtures with regard to branch fixture lengths and non-recirculated hot water piping.	Compliance with federal guidelines.
ND-34	Plumbing	All domestic water cold, hot and hot water recirculation piping shall be copper with soldered fittings.	Best combination of attaining useful life and resistance to development of biofilm.
ND-35	Plumbing	No brass materials allowed, unless de-zincified rated.	Brass is very susceptible to certain water treatment strategies.
ND-36	Plumbing	Domestic hot water delivery temperature to each fixture requiring same shall be 160 degrees F. minimum; hot water generation temperature must be increased to account for 160 degree F. delivery temperature.	Water quality management.
ND-37	Plumbing	Provide isolation valves as directed on drawings.	Facilitate maintenance and flexibility in operation.
ND-38	Electrical	All electrical lines/wiring is to be copper.	State and campus standards.
ND-39	Electrical	Solar Photo-voltaic arrays and productions systems shall be provided as indicated on the roofs of the LTC and DOM buildings. These have been sized to assist in the desire to meet the Net-zero target for DOM building and LEED goals for both buildings.	Campus sustainability. Campus resilience in weather emergencies.
ND-40	Electrical	Generator minimum capacity as provided for in buildings per plans and narratives.	Redundancy and campus emergency management. Size increased to cover for chiller and pump loads. Also see BETTERMENT section.
ND-41	Electrical	Interior and exterior illumination levels and lighting fixture types in electrical lighting plans. Levels exceed code and follow ANSI-IES standards in documents.	Health and wellness related illumination levels and color temperatures for circadian rhythm assistance, glare control, quality of life for veterans. Levels exceed code and follow ANSI-IES standards in documents.
ND-42	Electrical	All 120V and above wiring to be in metal conduit except where shown otherwise on the documents.	Campus quality standards for long term performance.
ND-43	Technology and electrical	Site infrastructure electrical and technology distribution.	Support for complex balance of current existing systems and proposed campus upgrades for the future.
ND-44	Technology	Technology distribution design within campus buildings.	Discussions and approval of design direction by DOIT.

S. No.	AREA	BETTERMENTS	REASONING BEHIND BETTERMENTS
B-1	Electrical	Upgrade existing addressable fire alarm system panels to new panels across whole campus. Install fiber optic site infrastructure backbone and replace existing copper loop as part of this betterment. Refer to the 'Betterment' section of the electrical narrative for information.	Support for complex balance of current existing systems and proposed campus upgrades for the future.
B-2	Electrical	Meet and exceed Net-Zero building target for the Domiciliary. Maximize production of solar energy on site with a combination of roof-mounted (Lippincott and or Nielson Building) or remote parking lot and remote grounds mounted panel arrays and distribution. Refer to the 'Betterment' section of the electrical narrative for information. Provide roofing modifications and electrical distribution as required. Coordinate grounds locations with Using Agency.	Upgraded campus sustainability, upgraded campus resiliency during extreme weather events.
B-3	Electrical	Provide whole campus-wide generator in addition to new building generators. Refer to the 'Betterment' section of the electrical narrative for information and sizing.	Supplementary power to rest of campus in case of extended power loss emergencies.
B-4	Electrical	Added generator capacity for chiller loads on LTC and DOM.	Campus resiliency.
B-5	Electrical	Copper wiring campus loop for telecom and fire alarm. Refer to the 'Betterment' section of the electrical narrative for information. Also refer to Technology	Support for complex balance of current existing systems and proposed campus upgrades for the future.
B-6	Technology	Provide copper wiring campus loop for existing telecom support. Refer to the Technology narrative.	Support for complex balance of current existing systems and proposed campus upgrades for the future.
B-7	Architecture	Provide for an upgrade to window systems in the LTC and DOM to triple glazed (IGU) Insulated Glazing Units across new buildings to target a "U value" of 0.16	Multiple manufacturers are able to provide this feature. Advantages include upgraded sustainability standard, better thermal comfort at resident units in long-term care.
B-8	Architecture	Provide for remote compressors on refrigeration equipment in each of the household kitchen areas. Move compressors to the ceiling space in the pantry	Resident comfort from lower noise levels for hearing-impaired population within household dining and kitchen commons areas
B-9	Architecture	Provide for enclosing the open terraces at ends of the DOM building and convert the space into enclosed den areas.	3-season usability, winter time sun-room use

S. No.	AREA	SOLE SOURCE	REASONING BEHIND SOURCE REQUESTS
SS-1	Electrical	Use Fire Alarm systems as manufactured by Simplex	Campus wide ease of reporting, maintenance, management. Using other manufacturers would necessitate significant costs from device replacement across multiple older buildings
SS-2	Technology	<p>The nurse-call, care team collaboration, resident Wandering Management, and the owner's Electronic Healthcare Records (EHR) systems need to be seamlessly integrated with each other and with nursing and care staff mobile and wired interface devices.</p> <p>- Nurse Call product solution : Hill-Rom "Voalte" integrated Nurse-call and patient/resident monitoring, care staff collaboration and communication</p> <p>- Patient Wandering Management product solution : ACCUTECH Resident Guard systems – as a Basis of Design for seamless integration with nurse-call and care team collaboration system</p> <p>- EHR product solution : IDVA and IVHQ current use EHR product POINTCLICKCARE for Electronic Health Records software (owner provided and managed).</p> <p>The above systems are to be considered sole-source unless otherwise proposed and approved by the Owner</p>	<p>IDVA and IVHQ use POINTCLICKCARE for Electronic Health Records software.</p> <p>Seamless integration is required with IDVA's care systems across multiple campuses distributed across the state of Illinois, and across IVHQ's existing and future buildings on the Quincy campus.</p>
SS-3	Plumbing	Water monitoring language (will be added/edited by Bric by 11/06)	Water quality management and wellness is a campus priority
SS-4	Plumbing	Rane Corporation bathing and spa tub solutions and products are to not be considered for the project	Prior history of technical and service issues on campus related to quality assurance, maintenance and support

OWNER PROGRAM REQUIREMENTS
BRIDGING USER AGENCY PROJECT REQUIREMENTS



Quincy Illinois Veterans' Home
New Domiciliary
New Nursing Home



November 7, 2019

Prepared for:

**State of Illinois Capital Development Board
Illinois Department of Veteran Affairs**

Design Builder



USER AGENCIES

State of Illinois Capital Development Board
Illinois Department of Veteran Affairs

BRIDGING ARCHITECT

Perkins Eastman - Chicago

BRIDGING TEAMS

Middleton Construction Consulting

Webb Engineering Services

David Mason & Associates

Food Facilities Concepts

Hitchcock Design Group

Tropical Environmental

Shen Milsom Wilke

GSG Consultants

BRIC Partnership

Images, Inc.

ArchiTech

HPZS

NV5

OPR DRAFT HISTORY

Draft 1: October 15, 2019

Draft 2: November 2, 2019

1.0 DEFINITIONS

- A. **Bridging Documents:** Schematic architectural, engineering drawings, specifications, and narratives of sufficient clarity and detail to enable Design-Builder teams to determine scope of the work. Then to author design development and construction document plan sets, finalize specifications, perform costs estimations to execute the work.
- B. **Deconstruction:** The selective, methodical dismantlement of a built environment - building, or site in whole or in-part as a waste management planning strategy. The harvest of materials and/or architectural elements and/or building systems that may be re-used, repurposed, recycled, salvaged, and/or hold financial or historical value.
- C. **Cultural Landscape:** An officially designated geographic area that includes both cultural and natural resources associated with a historic event, activity, or person or that exhibits other significant cultural or aesthetic values.
- D. **Green Business Certification, Inc.™ (GBCI®):** Headquartered in Washington, D.C., GBCI is the premier organization independently recognizing excellence in green business industry performance and practices globally. GBCI is the building certification and accredited professional credentialing body that administers third-party building certifications and professional credentials for LEED®, WELL™, EDGE, GRESB, ParksmartSM, PEER, SITES®, TRUE™, and ICP. www.gbci.org
- E. **Environmentally Preferable Product (EPP):** A product, material, assembly, or system exhibiting characteristics that pose low-no danger to human or environmental health. EPPs align with sustainable design, construction, operations, and maintenance attributes as defined by the U.S Green Building Council and other organizations. EPP materials exhibit characteristics including but not limited to:

Recycled, Reused, Repurposed, Salvaged	Extracted, Manufactured, Purchased (100 miles)
Environmental Product Declarations	Low – No VOC Emitting
Bio-Based Materials	NAUF: No-Added Urea-Formaldehyde
- F. **FFE - Furniture, Fixtures, and Equipment:** FFE includes furniture, shelving, office and/or modular partitions (including internal wiring & devices), appliances, computers, electronic equipment, data & phone equipment and partitions. FFE is also defined to include equipment that has no permanent connection to the structure of a building or utilities.
- G. **Hazardous Material:** Any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.
- H. **Integrative Process:** A shift in typical design and construction approaches focusing on intensive collaboration. Individuals are required to step out of their traditional silos and actively embrace alternative thought processes such as systems theory, consensus decision making, and nonhierarchical leadership. Integrative methodologies serves as a backbone to improved design, sustainability, and cost reduction.
- I. **Integrative Process: LEED Credit:** The Integrative Process sector, credit (prerequisite for Healthcare) is part of all LEED v4 and v4.1 rating systems. Its intent is to support high-performance, cost-effective project outcomes through an early analysis of the interrelationships among systems. Requirements are based on the ANSI Consensus National Standard Guide© for Design and Construction of Sustainable Buildings & Communities. [Integrative Process \(IP\) ANSI Consensus National Standard](#)
- J. **LEED® - Leadership in Energy and Environmental Design:** The U.S. Green Building Council's LEED v1.0 for New Construction rating system launched in 1999. It was the first third-party verified performance

green building certification of its kind. As of 2019, the USGBC authors 7 individual rating system sets that include 25 rating systems. LEED addresses nearly every new and existing building typology including neighborhoods, cities, and transit systems. LEED is the preeminent, internationally recognized performance green rating systems.

LEED is based on meeting prerequisites and achieving credit points to quantify and qualify levels of building's sustainability features. LEED provides a rigorous and obtainable framework for identifying and implementing practical, measurable performance green building solutions. LEED holistically addresses sustainability through 8 sectors:

- | | |
|--------------------------------|---------------------------------|
| 1. Integrative Process | 5. Energy Efficiency |
| 2. Location and Transportation | 6. Materials and Resources |
| 3. Sustainable Sites | 7. Indoor Environmental Quality |
| 4. Water Efficiency | 8. Innovations |

- K. **LEED® BD+C Rating System Set:** The U.S. Green Building Council authors all LEED rating systems. The Building Design and Construction (BD+C) rating system set is comprised of 8 rating systems addressing:

- | | |
|---------------------|--------------------------------------|
| 1. New Construction | 5. Data Centers |
| 2. Core & Shell | 6. Warehouses & Distribution Centers |
| 3. Schools | 7. Hospitality |
| 4. Retail | 8. Healthcare |

- L. **LEED Certification Achievement Level:** All prerequisites must be met to achieve certification. Building certification level designation is met by achieving credit points listed below.

Certified: 40 – 49 **Silver:** 50 – 59 **Gold:** 60 – 79 **Platinum:** 80 - 110

- M. **LEED v4 and v4.1 Interchangeable Credits:** February 19, 2019: USGBC announced that in addition to registering projects under LEED v4 or v4.1, project teams have the option of registering under v4 with the ability to use any LEED v4.1 prerequisite and credit in place of that its v4 counterpart the project team chooses. <https://www.usgbc.org/articles/substitute-any-leed-v4-credit-leed-v41>

- N. **Light Pollution:** Waste light from building sites that produces glare, is directed upward to the sky, or is directed off the site. Waste light does not increase nighttime safety, utility, or security and needlessly consumes energy. Light pollution negatively impacts the nocturnal natural environment, flora and fauna and reduces view of the natural night time sky.

- O. **PBTs (Persistent Bioaccumulative Toxins):** Chemicals and neurotoxins which break down extremely slowly in the environment, accumulate within animal tissues in increasing concentrations up the food chain, remain in the environment for long periods of time, and are not readily destroyed, (Mercury, Polychlorinated biphenyls (PCBs), Hexachlorobenzene (HCB), etc.)

- P. **Performance Green Building:** Built environments that integrates and optimizes major and minor systems and features to exceed minimum standards and code. Performance Green buildings typically surpass standards and code performance by a minimum of 20%.

To achieve established goals to exceed typical code performance and/or achieve third-party verified green certifications, the integrative processes and triple bottom line decision making are often required.

- Q. **Triple Bottom Line:** The equitable balance between Economic Viability, Social – Human Prosperity, Health, Well-being and Sound Environmental Stewardship. The tenets of Triple Bottom Line decision making are core components to performance green building, sustainability, resiliency, and the regenerative process.
- R. **U.S. Green Building Council® (USGBC®):** Established in 1993 as a 501(c)3 organization the USGBC authors the LEED rating systems, facilitates the annual GreenBuild Conference and Exposition, and facilitates the growth and development of Chapter Organizations internationally.
- S. **VOC Emissions and Content Evaluation:** Product has been tested according to California Department of Public Health (CDPH) Standard Method v1.21–20170 and complies with the VOC limits. Product meets the VOC content limits outlined in one of the applicable standards and for projects in North America
- T. **WELL Building™ :** WELL is a global tool for buildings premised on a holistic view of health: human health as not only a state of being free of disease - which is indeed a fundamental component of health - but also of the enjoyment of productive lives from which we derive happiness and satisfaction. Healthy spaces protect us from that which can make us sick, promote practices that can keep us well, and facilitate opportunities for us to connect with one another and live our lives to the fullest.

2.0 DESIGN BUILDER RESPONSIBILITIES

The selected Design Builder team will be responsible for the continued development of the Owner Program Requirements and authoring the Basis of Design. They shall author design development, construction document, and permitting plan sets, along with specifications. The Design Builder shall be responsible for cost estimating, bidding, construction management, construction, [FFE and its installation], tabulation, and post-construction warrantee work as prescribed and required in their scope of work contract.

Bidding documents will provide the Design Builder team with information and the platform required to complete the Work which consisting of:

1. New Long Term Care – Infirmary : Pursuing the goal of LEED Gold® v4 – v4.1 certification
2. New Domiciliary Building: Pursuing the goal of LEED Gold® v4 – v4.1 certification
3. Central Utility Plant and New Electrical Infrastructure
4. Minor renovations of selected existing buildings

3.0 OPR INTRODUCTION - EXECUTIVE SUMMARY

The intent of the Owner Program Requirements (OPR) is to accurately and effectively communicate User Agency project vision; their expectations, goals, and requirements. The OPR should be distributed to all Design Builder personnel and to all those subcontracted.

The Design Builder must review OPR contents with the maximum quantity of individuals possible. Whether it be senior project managers and superintendents or on-site laborers and off-site subcontractor administrators, the more personnel that understand goals and requirements the greater the successes and less likely there will be incongruences.

Once fully developed the OPR becomes an important User Agency tool for judging Design Builder performance. The 'Bridging' OPR contains detailed, descriptive information gathered the months of efforts lead by 'Bridging Architect' Perkins Eastman – Chicago.

The OPR contains narratives to communicate the concepts and intent baked into bridging designs, all of which convey User Agency requirements. The OPR communicates 'big picture' design intent as well as the nuance of why specific design choices are specified in bridging documents.

The OPR is perhaps one of the most under-utilized, least understood tools in the industry? Its purpose is similar to that of Building Information Modeling's (BIM) job to ensure building systems work seamlessly to accomplish their intended purpose. What would happen if a ventilation duct was installed in the same space as a domestic hot water piping should be? What happens when a 2 hour rated firewall is installed when a 4 hour rated firewall was designed to meet local code?

The OPR is the tool that helps to ensure 'everyone' is on the same page. Whether it be the professional engineers or team responsible for the buildings' final cleaning, everything is connected in some way.

The OPR should evolve team unification resource for the Design Builder designers and User Agency during design development. It gives teams a comprehensive unified understanding of aesthetics, purpose, intent, security, and performance expectations. The OPR gives Design Builder teams the User Agency requirement for how they want staff, occupants, and visitors to experience the campus and buildings. The OPR is an invaluable tool for Design Builders to better understand relationships between engineering, architecture, interior design, and scheduling among others. The OPR helps guide Design Builders on the design, installation, and operation of energy, waste, water, lighting, outdoor air, and sewage conveyance systems among others including their myriad of complexities.

It serves as a project-wide design and construction guideline and communication tool to describe in detail how the final product should provide a healthy, comfortable, safe, and clean indoor environment where meals are served and residents are cared for. It is the OPR that gives the

Design Builder critical information about User Agency's requirement to create high-performing, durable, low-maintenance, sustainable buildings that instill a sense of well-being to all those who work, live, and visit them.

Design Builder, each Design Builder team, and each individual associated with the project's design, construction, operations, and maintenance must become familiar with the bridging OPR and Bridging Architect Project Manual Volume 01: Architectural Narrative, no matter their respective position or discipline. It is the obligation of every Design Builder team member to fully comprehend the intensions, time, resources, and efforts invested in to the Bridging Design Documents that preceded the inclusion of the Design Builder.

In its final form the OPR will be the go-to reference for the Design Builder designers and constructors; the User Agency and their building operation managers, campus operation managers and their departments. Even to those such as the director of campus security, central plant managers, landscape maintenance managers, and campus facility administrators in and outside project scope.

3.1 BASIS OF DESIGN (BOD)

The BOD is an associated document also serving as a project-wide communication tool. The BOD is used in conjunction with the OPR. The OPR lays out User Agency expectations, requirements, and goals in narrative form. The BOD lays out and communicates User Agency expectations, requirements, and goals in high-level technical terms. The BOD provides technical data, performance metrics, functionality and operation criteria for the gamut of engineering (MEP-HVAC-Civil-Structural-Infrastructure), control systems, building automation systems, building envelope, way-finding, information technologies, security, commercial kitchen, laundry, medical equipment, residential appliances, dwellings, renewable energy, domestic hot water, process water, ventilation and water purification, life safety, fire protection, specialized equipment (elevators, disability and infirmed transport, back-up electrical generation, disaster preparedness, public announcement, media) and others. The BOD provides technical details to serve as a platform for authoring final specifications, installation procedures, schedule phasing, cost estimating, and alternative compliance substitution.

3.2 DESIGN BUILDER BOD AUTHORIZING

The Design Builder is required to utilize this document to launch the authoring and development of a comprehensive Agency User BOD, to meet requirements and intent stated within and outlined in commissioning specifications. A finalized BOD is a required component of LEED v4 BD+C NC prerequisite 'Fundamental Commissioning and Verification, as is the OPR. The BOD is an essential part of the Commissioning Plan and associated commissioning activities that ensures designed systems, their intended performance and functionality metrics are in accordance with, and align with those installed in the project. The BOD supports the Fundamental and Enhanced Commissioning

Plans' implementation ensuring designed and installed systems function and operate as intended upon completion of initial occupancy and 10 months post-occupancy. A Bridging BOD has not been provided and is not included in Bridging Document scope.

3.3 DESIGN BUILDER BRIDGING OPR – BRIDGING PROJECT MANUAL

This document represents the 'bridging' OPR. The Design Builder is required to integrate the contents within along with the contents of all bridging documents. The Bridging Architect's Project Manual Volume 01: Architectural Narrative will provide outlined topics and design elements to continue OPR development. Agency User/Owner Program Requirement continued development and initial authoring of the BOD must coincide the commencement of design development and continue as needed throughout the construction document phase.

3.4 DESIGN BUILDER EARLY OPR CONTINUED DEVELOPMENT

It is strongly encouraged to prioritize an early as possible review of this document. This document is intended to serve the Design Builder in an early launch of OPR continued development as there are many benefits. The Design Builder may wish to use more developed OPR language to include in sub-contractor and vendor contracts? An early start supports quicker understanding of Agency User goals, needs, and requirements. It may prove helpful in synchronizing with Bridging Architect's Bridging Documents. With early OPR development Design Builder teams will be better equipped to start design development activities sooner in context of the project's myriad of complexities?

3.5 OPR EVOLUTION

The Design Builder should compel and/or require individuals across disciplines to provide written and/or verbal feedback and comments prior to or no later than 5 working days of the OPR review meeting so they may contribute to OPR development quickly. The Design Builder shall encourage and seek out comments, questions, concerns, input, and suggestions from every individual no matter their role, no matter their duties. As part of the Integrative Process, cross-disciplinary contributions are strongly encouraged, proven invaluable to improving project outcome.

OPR and BOD evolution coincides design development and is a requisite for achieving LEED credit IPc1: Integrative Process, Commissioning Plan development, and User Agency sustainability goals.

3.6 OPR - A DECISIVE TOOL

When the Design Builder and Design Builder teams contribute to the OPR, they become more intimate, more rapidly with required criteria and strategies expected by the User Agency. As team members further their comprehension of the OPR and Bridging Documents, the higher the likelihood teams will be more efficient and more productive.

Combined with Integrative Process strategies a deep understanding of the OPR and BOD raises profitability while reducing conflict and risk. It is for these and many reasons that the OPR and BOD are required for the third-party commissioning and verification.

3.7 NV5 OPR - BOD - CX OVERSIGHT

NV5 shall facilitate the entire third-party fundamental and enhanced commissioning and verification process. This includes the ongoing evolution and development of the Owner Program Requirements and Basis of Design. The Design Builder is required to include the NV5 Commissioning Authority (CxA) in all applicable design reviews during the Design Development and Construction Document authoring phases. The Design Builder is required to seek out the CxA's expertise and guidance to support decision making related to systems scheduled to be commissioned. The NV5 CxA reports to and performs tasks on behalf of the User Agency to ensure the established qualitative and quantitative design parameters align with and function as intended during real-life installed conditions. Installed real-life performance prior to occupancy and 10 months post-occupancy is considered the primary qualitative measurement to project systems successful functionality. A central benchmark indicator to the success of the project and User agency satisfaction.

3.8 NV5 SUSTAINABILITY – LEED CERTIFICATION OVERSIGHT

NV5 shall be overseeing and supporting the Design Builder teams to ensure the User Agency's and Bridging Architect's designs, strategies, and requirements are met to achieve the goals for sustainability, resiliency, and LEED Gold certification.

3.9 DESIGN BUILDER OPR – BOD TEAM UPDATE REQUIREMENTS

OPR evolution initiates and maintains a constructive, integrative, collaborative dialog not only between the Design Builder design and construction teams, but also the User Agency. The Design Builder is required to evolve the OPR and BOD coinciding design development. The Design Builder shall communicate changes and updates to the OPR and/or BOD through digital and/or hard copy document distribution avenues, discuss during weekly project update meetings or other means. The Design Builder must ensure updates to the OPR and BOD are efficiently communicated to personnel as applicable.

3.10 INTEGRATIVE PROCESS

Embracing and implementing integrative process strategies as early as possible cannot be over emphasized. As part of the integrative process and achieving criteria and requirements found in LEED credit IPc1: Integrative Process the Design Builder must consider techniques that include facilitating in-person, multi-discipline, lengthy charrette meetings.

If the Design Builder does not already have an experienced integrative process facilitator consider adding an Integrative Process Facilitator to the team. Face-to-face lengthy, collaborative focused, multidisciplinary charrette workshops serve as the backbone to the integrative process. The Design Builder should consider contracting a facilitator and organizing an initial charrette workshop 'before' embarking on design development. If this initial charrette is not held before design development, the effectiveness and beneficial outcomes decrease rapidly.

The outcome of embracing the integrative process has been proven to yield an array of benefits that include Design Builder team strong unification, reducing personal conflict, markedly improved collaborations, rapid decision making, streamlining design, construction, construction management, project administration, and exceeding sustainability goals with no to low cost increases. Additional benefits include reduced risk, cost, waste, and effort. Please see the following integrative process guidance and benefit documents :

- [Integrative Process \(IP\) ANSI Consensus National Standard](#)
- [LEED BD+C: New Construction LEED v4 Integrative process](#)
- [AIA Integrated Project Delivery](#)

4.0 PROJECT HISTORY

The latter half of 2018 saw the completion of a Masterplan for the Illinois Veterans' Home in Quincy. The plan broadly defines the needs of the campus at a programmatic and infrastructural level to support a phased expansion and modernization.

With the completed Masterplan the State of Illinois's Capital Development Board ('CDB') commissioned Perkins Eastman Architects to develop schematic design and create "Bridging Documents," to launch the Design-Build phase to occur over a four to five year period.

In December 2018, Perkins Eastman commenced the work as the 'Bridging Architect'. One of the first objectives was to perform an in-depth, detailed set of analyses with an investigation and analysis of the site and followed by a broad set of programming exercises to define the needs of the 'User Agency', campus users, and operations and maintenance personnel to identify challenges and begin to develop preliminary strategies to meet the needs for the campus, the new and existing buildings that are considered as part of the Work.

The Projects' bridging phase consisted of extensive integrative process meetings and charrettes, programming analyses, existing condition evaluations and production of refined design plan sets, system specifications. Bridging documents will be used to select and qualify a Design Builder team.

5.0 CAMPUS REPOSITIONING

The project is a first major step in transforming the campus towards the vision put forth in Quincy Illinois Veterans' Home Masterplan. There are 47 buildings residing on the approximately 220 acre campus. The Work consists of the New Long Term Care – Infirmary, New Domiciliary Building, New Utility Tunnels and Ground Level Pedestrian Thoroughfares to link buildings, and new electrical infrastructure. Renovations will be made to the central utility plant and other selected buildings. Site development includes necessary utilities to support the new and existing buildings', their entry plaza(s), hardscape, landscape, parking, and site security.

The new buildings, renovations, and site improvements follow the intent of the masterplan which is to unify and enhance the entire campus experience. The vision is to create a robust, aesthetically pleasing environment to support and grow the physical and mental health, well-being of occupants, and staff. The landscape of indigenous, native plantings, distinguished contemporary, yet fitting architectural style family and friends of the residents will be apt to visit frequently and spend more time with their loved ones.

The new buildings and site elements have been designed to embody the vision of the Department of Veterans' Affairs and Illinois Capital Development Board have for the future expansion of the Quincy Veterans' Home and facilities like it. The buildings have been thoughtfully designed incorporating the opinions, preferences, and desires of occupants,

personnel, and facilities operations and maintenance staff. not extravagant, with simple design gestures utilizing basic elements providing light filled spaces. Spaces shall include a common palette of interior, exterior and site materials and details that are used in a manner appropriate to the site and each building.

6.0 MISSION - VALUES

HONORING ECONOMICS, HUMAN BEINGS, AND THE NATURAL WORLD

The State of Illinois and Department of Veterans Affairs shared core values is to honor citizens and veterans to the greatest extent possible. This project stands a testament to those values by creating state-of-the-art facilities to honor the physical and mental health, well-being, and prosperity of those who have served the nation.

This project intends to set a new benchmark for similar facilities in the state and around the country. Illinois and the VA are committed to providing facilities that embrace the adoption of a paradigm shift. A shift from the unsustainable 'bottom line' culture to a sustainable 'Triple Bottom Line' culture. Rather than a primary focus on dollars, as a culture we must shift towards creating balance between economic, human, and environmental prosperity.

The shift to the 'triple bottom line' is astonishingly simple, based on proven practices employed for centuries.

7.0 BRIDGING ARCHITECT – BRIDGING DOCUMENTS

The Design Builder must refer to the Bridging Architect's Volumes 01 – 03 to continue further develop and refine this document so it may evolve towards completion.

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Introduction

With approximately 220 acres, the campus is located south west of Illinois along the Mississippi River in Adams County. In Quincy, the campus is bound along N. 12th Street to the east, N. 5th Street to the west, Locust Street to the south, and the BNSF railway to the north.

The projects include the construction of a new 210-unit Long Term Care facility, a new 80-unit Dormitory, and renovations to various structures on the campus. The project building footprints are located at the heart of the campus. The infrastructure and utility upgrades, however, extend past this immediate area of impact and extend to other areas of the campus.

Bridging Document design intent, phasing and context

The project Bridging Documents will be comprised of Bridging Team drawings and project manuals, which will be included in the Request for Proposal (RFP) from the CDB.

The project manual is assembled in the form of design narratives that are used to describe the design intent for the project. The intent has been established after the programming phase and after meetings with the various regulatory agencies and Authorities Having Jurisdiction ('AHJ's).

Due to the extent of regulatory input into the design development, it is required that the design intent expressed in the narrative for each discipline is adhered to in the development of the design. An example would be the move to develop the design using the VA's support for Small House models of care and operation and related limits on the number of resident rooms per household and neighborhood. Another example would be the careful correlation between the phasing adopted by the CDB and the IDVA and the mechanical narrative outlining the continuity of campus-wide heating and cooling operations.

Project outline specifications are assembled in the Project Manual Volumes 1, 2 and 3 as to help guide expectations and generate minimum standards for quality, in conjunction with required code and regulations.

The Bridging team has viewed and analyzed existing conditions on campus and utilized knowledge gained through leadership meetings, staff interviews, Federal and State regulatory agency pre-reviews and considered long-term durability, maintenance and life-cycle performance and cost analysis when establishing the Bridging Documents. These deliberations, in consultation with the Using Agency and the Capital Development Board, have informed the design. These drawings have been coordinated as best possible with the architectural work and engineering disciplines as appropriate for this limited stage of design.

These documents are not to be considered representative of the only solution for the Design- Build work, nor are they to be considered fully complete or accurate, and representative of what is needed to design and construct the project; it is fully the responsibility of the Design-Build team to provide all engineering design and construction phase services to meet the codes and standards stated, all applicable codes and standards for design and construction in Illinois. Further, they shall meet all requirements to allow the Illinois Department of Veterans' Affairs (IDVA) to make federal reimbursement submissions to the United States Department of Veterans' Affairs (USDVA)

The Bridging Documents architectural and engineering teams will remain available for general consultation as approved or authorized by the CDB, but all design and design related decisions shall be the responsibility of the Design-Build team.

Certain minimal items or strategies deemed critical to campus or agency operations are listed under the ***No Deviations List***. Certain other items required for consistency of Agency operations are includ-

ed in a Sole-Source list. The D-B shall refer to this list for scope and requirement that cannot be deviated from. Any deviation from this list could result in negative impacts to the D-B's evaluations, unless otherwise supported with sound and logical reasoning, cost impacts in meeting the listed item(s) and alternative suggestions that will meet or exceed the stated design intent. Deviations will only be accepted after CDB-IDVA review.

All construction activity and site disturbance should follow the minimum standards set by the Illinois EPA for the Stormwater Pollution Prevention Plan ('SWPPP'). However, as this remains an actively used and operated campus housing our veterans during the construction phase, all construction activity on campus shall be well planned, scheduled and coordinated carefully. Access to campus and emergency services and utilities need to be operational through the process of construction, and coordinated with the campus leadership and CDB project manager.

Site context and campus planning

The Illinois Veterans Home in Quincy, founded in 1886, has gone through numerous transformations throughout its history. The modernization over the years has resulted in a collection of buildings with a myriad of sidewalks and roads without clear wayfinding strategies and a lack of cohesion on campus. As the bridging and leadership team creating a vision for the new Long Term Care and Domiciliary, it is critical to understand its inherent impact on this beautiful historic campus.

The following planning principles have guided the design for the overall site and its buildings:

- Enhance the a sense of community
- Add cohesiveness to the campus
- Enable clarity in wayfinding
- Create a sense of place
- Establish a hierarchy of space within campus
- Celebrate history
- Transform the image of the campus
- Reinforce the positive historic context within the campus

Site development includes work associated with infrastructure demolition, utility replacement and improvement, landscape/hardscape, parking, and existing monument relocation to support the projects.

Creating and enhancing connectivity

In addition to enhancement of the sitescapes and new buildings, one of the important features of the new campus development is to provide seamless connectivity for both pedestrians and services behind the scenes.

- Pedestrian Connection

Currently, buildings are spread out within the large campus, making it difficult for the residents to travel between the buildings, especially during inclement weather. An example is the Multi-Therapy building, which is meant to serve all the residents on campus for the fitness, therapies, exams, and aquatic facility. However, since Kent Infirmary with the direct link to the Multi-Therapy building has been vacated, the use of the Multi-Therapy has declined significantly.

In addition, the Using Agency would like to ensure that the residents of the Fifer Infirmary also can equally enjoy the new amenities in the LTC building and Multi-Therapy without being exposed to inclement weather.

To address these concerns, the north elevator in the new LTC building is allotted to bring residents from the first floor main Town Center to the lower level, where an indoor corridor is provided to permit the residents to travel from LTC to Multi-Therapy, and to the lower level of the Fifer Infirmary. The Multi-Therapy building will receive an elevator tower addition to allow the residents from both the LTC and the Fifer Infirmary to access the Multi-Therapy level through internal connection.

An outdoor covered walkway is also added to connect independent residents/staff to travel between the Domiciliary to the Town Center amenities in the LTC building. The covered walkway is intended to be open and integrated with the surrounding with series of colonnades, without becoming a physical barrier.

- **Outdoor Covered Walkway Design**

The covered walkway is provided for the convenience and safety of the residents to promote active pedestrian connectivity while being better protected from the weather. The walkway is designed to be open and integrated with the surroundings in the form of a light colonnade without becoming a large or imposing visual barrier. Details for the colonnade in a narrative format are included in the drawings in Volume - 3.

- **Service Connections**

A network of service corridors will be provided from the LTC lower level to Nielson, Multi-Therapy, Fifer, as well as to connect the two neighborhoods within the LTC.

The middle level of the Nielson is proposed to be renovated to include the main loading and trash collection for the LTC. The new LTC lower level service corridor will extend to the middle level Nielson to allow for goods and services to be transported to the new LTC.

The lower level LTC service corridor will connect between two neighborhoods to allow support/services to travel behind the scenes through service elevators to each neighborhood.

The service corridor will be further expanded to serve the Fifer Infirmary, therefore eliminating the need for food and service transport by truck, but rather through the internal service corridor.

Art-in-Architecture Program

This project qualifies for funding through the [Illinois Art-in-Architecture Program](#) and one-half of one percent of the project budget has been set aside for the commission of purchase of site-specific artwork. The bridging design team has identified potential types and locations for artwork in the furniture plans in the Bridging Documents. Additional locations or further refinement may be required depending upon the final decisions of the Dept. of Veterans' Affairs staff. The Design-Builder team will coordinate the installation of this artwork.

Throughout the project, the Design-Builder team shall participate by

- Attending Using Agency Steering Committee meetings to determine the appropriate locations and media of artwork.
- Attending all Fine Arts Review Committee meetings as set forth in statute.
- Providing CDB necessary documents, drawings, renderings, specifications, product data, etc. to assist the artist in the design and installation of the artwork.
- Attending meetings with CDB, artist, and user to coordinate work.
- Reviewing artwork renderings, drawings, specifications, shop drawings and any other documentation required for the project.
- Coordinating the provision for the design and supporting aspects related to artwork installation, which may include foundation, structural support, and illumination.
- Providing on-site observation and report field conditions as necessary to coordinate the artwork process.
- Providing the protection of artwork that is installed prior to substantial completion.
- Participating in the substantial completion inspection of the artwork.

Smart Technology

The new buildings will be integrated with state-of-the-art technology following industry current best practices. The strategies were developed by the team of design consultants in working sessions in conjunction with Illinois Department of Innovation and Technology (DOIT) and reflect strategies including, but not limited to, IT, AV, Security, Wander Management, and Nurse Call.

Long Term Care Building (LTC)

Design Principles

The main design principles for the Long Term Care building are to create a state-of-the-art community and a healthy home for Veterans. According to the VA Small House (SH) Model Design Guide, (Rev. March 2019), the Small House Model will promote culture change and a transformation needed for the residents' health and well-being.

The new building is considered an "essential facility" per the VA Design Guide, and therefore shall be I-2, Type IA construction type (IBC 2018) and shall be designed with Risk Category IV requirements.

Siting of the Long Term Care (LTC) building

Based on the masterplan, the new Long Term Care building will be located across from the existing Fifer Infirmary building, and adjacent to the Multi-Therapy building to create a community of the Long Term Care and services within the vicinity. The existing Kent Infirmary, currently sitting vacant, and the Elmore Infirmary, Truck Maintenance, Vehicle Garage buildings will be demolished to provide the lot for the Long Term Care.

To align with the overarching goal of creating a cohesive campus within the historical context, the LTC building planning considered all sides of adjacent buildings and site to provide a building that is integrated with the scale and the materiality.

The overall configuration of the LTC has been derived from the simple adjacency concept diagram developed during the programming phase to be situated within the campus without taking up too much site and crowding the campus. The public facing side of the campus quad embrace the center of the campus with the arc. Each of the household wings spread out facing the Fifer side to provide a quiet residential feeling, with enriched resident garden between the households.

The scale of the building also contributed the stepping of the building. The southern neighborhood buildings stands 4-story tall next to the Old Stone Building while the northern neighborhood steps down to 3-story to blend in better with surrounding low rise buildings to the north.

The main drop off of the LTC is planned across from the Fifer to create a combined Long Term Care community. The residential buildings with the households are placed closer to the Fifer to promote the residential community characters with private gardens and away from the campus quad. These characteristics are architecturally reflected with the punched windows for the residential units and large glasses for the more public functions, such as the dining and living room.

The public Town Center on the first floor as well as the residential neighborhood amenities are located in respect to the campus quad to foster the inviting community characters. The placement is to activate the historic core of the campus by providing active spaces, such as a pub/café with outdoor dining and classes that can be spilled out to the outdoor patio when the weather is accommodating. The architecture also creates the open, inviting, and more public characters, with the use of the large expanse of glass, and monumental materials such as lime stone and terrazzo. The use of the wood-like trellis sits above the first floor community center

Household

Based on the VA's Small House Model Design Guide (Rev. March 2019), the new Long Term Care has been designed with the concept of the Small House (SM) Model. During the programming phase, the team discussed many different small house scenarios ranging from 10-bed to 20-bed per House. Based on the VA's guideline, staffing model, and operational efficiency, the final household size was determined to be 15-unit per house, with a neighborhood comprising of two households.

Per IDPH, each Household will be defined as a nursing unit. The ultimate goal for the design team is to promote the intimate residential environment without being institutional in character.

- Private Resident Room

Private resident bedrooms and bathrooms provide the basic building blocks for the household. The various room configurations, details, and staff interactions with residents are reviewed and reflected in the layout. The design adheres to the VA Space Planning Criteria (PG-18-9 Chapter 106), which recommends minimum 230 sf for the resident room, 85 sf for resident bathroom, and 8 sf for resident closet.

During programming phase, it was discussed that a mock-up of the typical resident room shall be provided to finalize the details.

The following items have been discussed in great details with the IDVA and Using Agency for the needs/requirements within the resident rooms. Any deviations shall be presented and approved by the Using Agency.

- The general room layout includes a resident bed, a lounge chair, a nightstand with drawers with a lamp that's fastened to the nightstand, a TV, a built-in desk, and a built-in full height wardrobe. A custom built pass-thru casework for sanitizer/sharps disposal shall be integrated by the entry foyer.
- Concealed lift track: It is desired to have lift track in each room. The main purpose of the lift track is to transport the resident from the bed to the toilet, or to the shower chair. Lift can be stored with charging station in the bathroom to maintain residential room environment and charged when not in use. The detail to integrate the lift track with the barn door track is strongly recommended to minimize the institutional appearance.
- Picture/light shelf is provided to supplement the ambient light source above the bed without the harsh light setting. The shelf is also designed to allow for the pictures/frames to be displayed for personalization of the room.
- Circadian lighting design can support improved sleep-wake cycles for those who may be suffering from dementia-induced anxieties that typically occur around sundown.
- The facility is required to have durable flooring options (minimum 20 year material life).
- The required head wall equipment for each resident bed will include oxygen, suction, and air. Details and further design to be completed to create a hidden yet convenient wall location above the nightstand with residential character. Per Small House Design Guide, it is important to avoid an institutional character, such as the pre-fabricated medical headwall units.
- Entry coat closet with the bottom shelf will be provided next to the pass-thru casework.
- Pass-thru housekeeping closet has been incorporated into the entry foyer for the staffs to supply the housekeeping materials without entering into the resident rooms. The pass through closet will include a work surface that can be pulled out to hold a laptop or clipboard for staff use.

- For dementia units, lockable cabinets will be provided to secure the grooming items, linens, and other supplies.
- Electric wheelchair charging: An outlet is provided by the entry foyer for electric wheel chair to be charged, without bringing it into the sleeping area.
- TV will be mounted on the wall to improve clearances.
- Large operable windows with exterior sunshades are provided for views, light, and to avoid the glare within the unit.
- Per PG-18-13 VA Barrier Free Design Standards (rev. 11/1/18), all resident units will incorporate 5'-6" turning radius for accessibility.

- **Resident Bathroom**

- Bathroom shall be located across from the side of the bed to allow for the direct view to the bathroom, and to align the lift track to transition from the bed to the toilet.
- A barn door is provided for the ease of operation and to save the floor clearance. A detail to integrate the overhead barn door track with the lift track from the sleeping area into the bathroom minimizes the institutional feel.
- Swing-down grab bar at water closets allow for flexibility for assisted transfer of the residents by staff, per the VA Barrier Free Design Standards.
- Floor mounted toilet is preferred for its residential character.
- Heating unit with integrated light shall be provided to supplement the heat after the shower.
- Night light to be provided in order to avoid fall risk at night.
- Built in shower seat is not permitted. Shower wheelchairs will be provided instead.
- Ceramic floor tiles are preferred due to durability.
- The vanity shall have countertop space as well as drawers for personal items.

- **Bariatric Unit**

- For each household, one bariatric unit across from the nurse station will be provided. D-B team to follow VA Barrier Free Design Standards to provide the appropriate bariatric requirements, including 6' turning radius and 4' door clearance.

- **Semi-Private Resident Suite**

- Each household is provided with two adjacent private units that can be converted into a suite for couples or friends. When not used as a couple's room, the two units will be used as two separate private units. Two rooms will have inter-connecting door in the demising wall. The D-B team shall ensure that the fire rating and the sound transmission between the two units to be maintained when used as two private units.
- All other design features for the private rooms to be provided for the semi-private units.

- **Household Commons**

Household common areas, including living room, den, dining, and kitchen, serve as active social spaces that allow the residents to come together in an intimate residential setting, as they would in their own homes. The various scaled spaces can be easily accessible by residents to encourage participation in various activities.

- Residents prefer high ceilings with large windows that provide views and outdoor connection. Sunshades or overhangs are provided to minimize the glare and heat gain.
- Kitchen/Dining: The kitchen and dining area serves as a heart of the Home. Culinary experience is one of the most important aspect of the resident life. The overall household layout is derived from sharing a pantry where the food is directly transported from the nearby service elevator, without carting the food cart through the resident space. The shared central pantry with kitchen for both households also allows for sharing staff during meal times.

The open kitchen layout enables the staff to be actively engaged with the residents throughout dining experience from the food prep and meal serving to dish washing. Care was given to create a residential setting for the open kitchen. Hidden induction warmers on the counter will allow for food warming without being seen. The VA guideline requires that each house will provide the ability to cook within each house. As a result, a type 1 hood is provided above the cooktop for cooking within the household kitchen, allowing for made to order meals in the house.

A nourishment station is provided adjacent to the kitchen to provide refreshments and snacks throughout the day. A refrigerator and microwave can be easily accessible for personal food preparation.

Overlooking the courtyard gardens, dining space provides different seating arrangement, 4-top tables, a farm table, and kitchen island seats to encourage different social interaction in different gathering sizes. A fireplace with soft seating by the dining space provides a warm and intimate residential setting. The environment is to provide a comfortable and active common area for the residents.

- Living Room: The living room is centrally located within the household and provides a different view out of the building than the dining and den spaces. The living room shall provide comfortable seating and furniture for activities. A higher ceiling in the living room extends out across the corridor to the feature wall, breaking down the appearance of length of the adjacent corridor. Large windows with shading are provided for views and daylight. While the dining room provides more active space, the living room offers a different social gathering opportunity.
- A terrace off the living room provides a place for residents to be able to sit and enjoy the outdoors.
- Den: A den is provided with a glass door and a side lite to allow for borrowed daylight into the corridor. It shall have privacy blinds or shades for any private consultation or family member to stay over.
- Seating Alcoves: Various alcoves are distributed throughout the House to allow for residents to take a break between transitions.
- Spa: The current residents use tubs often. Avoid using the tubs with internal reservoirs. Provide lift track for the tub. A training toilet is also provided within the spa area. The overall spa should offer a warm hospitality environment for relaxation, and avoid any institutional details.

- **Support and Staff Area**

Support spaces are treated as back-of-house space. It is recommended to minimize views to support doors and into staff and support spaces from adjacent common areas.

- Supply is decentralized in closets to minimize the staffs' travel distance.
- Several design features are included to eliminate or hide med carts from the corridor, including med cabinet within each room or med cart alcove along corridor.
- Nurse Station: The nurse station is placed at the bend of the House in order to secure direct line of sight to each of the resident unit doors, per IDPH requirement. Based on the discussion with USDVA, it was strongly recommended to reduce the size of the nurse station as a touch down station, with details to fit within the overall residential environment. From a Small House Model standpoint, nursing staff are encouraged to be engaged with residents throughout the House and throughout the day, rather than sitting at a nurse station. It is still important to accommodate the operational needs of the nurse station. A medical record room and a charting room are located next to the nurse station for ease of access. In addition, all required panels per the IDPH and VA's requirements shall be confirmed and provided with visible proximity in the alcove adjacent to the nurse station. An additional panel location may be required by the Dining Room to easily visible for the staffs while being hidden from residents' views.
- Med room is provided with a lockable casework and small lockable refrigerator.
- Trash will be collected within the household and immediately brought to the basement service area. Trash holding rooms are provided under each neighborhood.
- A central linen cart will be brought up to each neighborhood into a central linen room. The linen will be distributed throughout the houses into the satellite linen closets and pass-through closets within resident rooms.
- Nurse Lounge: A nurse lounge/breakroom is provided for each neighborhood with lockers and seating areas. A staff toilet is provided within the staff lounge.

Neighborhood Amenity

The concept of neighborhood is created for more than two households to foster a feeling of community at a neighborhood scale within the Long Term Care building. The neighborhood generally provides a place for socialization outside of the Household environment, through programs and activities. There is additional benefit from shared efficiencies of staffing and space use by combining two houses' needs

For the new Long Term Care, a total of seven neighborhoods are provided, with each neighborhood consisting of two Households. Typically, two neighborhoods are provided on each floor (floors one through three). The fourth floor is unique and consists of a single neighborhood to the south.

The following amenity spaces have closely been evaluated with the Using Agency;

- Elevator/Elevator Lobby: The elevator lobby in the upper floors will offer a sense of arrival within each neighborhood with its own wayfinding queues from different interior finishes and artwork. The view of the campus quad immediately greets the residents/visitors from the elevator lobby through the adjacent lounge/3-season porch with full height windows. On the

opposite side of the lobby, entry doors into each Household are provided with the buzzer for secure access.

- Lounge / 3-Season Porch: This destination serves as an additional gathering area that overlooks the campus within each neighborhood. This lounge is placed adjacent to the multi-purpose area for additional pre-function purpose.
- Multi-Purpose Room: The multi-purpose room can be used for larger gatherings and resident activities for each neighborhood. It is located adjacent to the restorative therapy space with a folding partition wall which provides flexibility to expand when a larger gathering space is needed.
- Restorative Therapy Space: Restorative therapy and some occupational therapy will be performed in neighborhood setting on the same floor. This reduces the need for staffs to transport residents to the multi-therapy building for all treatments. Adequate storage for equipment shall be provided. Therapy staff will rotate between the neighborhoods to provide resident therapies.
- Barber/Beauty: A barber/beauty room is conveniently provided at each neighborhood for the residents. The Using Agency required this room in addition to the household spa. This reduces scheduling conflicts between bathing and hair care appointments.
- Resident Laundry: The resident laundry room is provided for personal laundry by the residents' families and for light linens by staff.
- Central Nursing Office: Centrally located between two neighborhoods, the office space provides staffs to be able to reach each neighborhoods easily. Based on the feedback from the Director of Nursing, the staffs will be shared between two floors, with the following offices per each floor.

Shared Staffs for 3-4 th floors	4 FL- 1 Neighborhood (30 Residents)	<ul style="list-style-type: none"> ▪ 1 Private Office for Nurse Supervisor ▪ 1 Private Office for Social Worker
	3FL - 2 Neighborhoods (60 Residents)	<ul style="list-style-type: none"> ▪ 1 Private Office for 2 Social Workers to Share (i.e. 2 desks & 2 filing cabinets) ▪ 1 Private Office for MDS ▪ 1 private office for supervisor
Shared Staffs for 1 st -2 nd floors	2FL- 2 Neighborhoods (60 Residents)	<ul style="list-style-type: none"> ▪ 1 Private Office for 2 Social Workers to Share (i.e. 2 desks & 2 filing cabinets) ▪ 1 Private Office for MDS ▪ 1 private office for supervisor
	1FL - 2 Neighborhoods (60 Residents)	<p>The following offices will be located as a part of the administrative suite.</p> <ul style="list-style-type: none"> ▪ 1 Private Office for Director of Nursing for the entire LTC ▪ 1 Private Office for Assistant Director of Nursing for the entire LTC ▪ 1st Floor Supervisor <p>* Refer to Town Center description for all other offices in the administrative suite.</p>

- Connecting corridor between neighborhoods: The connecting corridor is provided for convenience mostly for the staff to travel between neighborhoods. The connecting corridor is designed to be primarily glazed to create a feeling of transparency through the building, while accommodating bird friendly frits or glazing.

First Floor Town Center

The first floor Community Space is designed to be inviting for visitors and serves also as a central hub for the residents on the campus. Spaces along the main gallery overlook out onto the central campus quad, promoting a sense of community. Ample south-westerly glazing allows daylight into and through the spaces and into the gallery. A continuous trellis above the first floor town center provides a comfortable outdoor space for resident gatherings, protected from weather and glare, while providing a pleasing pedestrian scale.

Based on findings during the Programming Phase, a large gathering space in the Long Term Care building is not needed. Larger, campus wide events will continue to be held in the existing Lippincott Hall building.

- Main Entry and First Impression: The drive and the porte cochere /drop off area is pulled away from the front door to limit the car travel into the entry courtyard. This helps to preserve the privacy of the resident units facing the entry courtyard. The covered pedestrian walkway from the porte cochere will guide visitors to the main entry vestibule, offering a hospitality procession through a beautifully landscaped garden. The entrance into the lobby has a high ceiling which immediately provides a clear view through the space, outwards to the main campus quad beyond. A library/business center with a fire place will provide comfortable lounge seating, a café with pleasing aromas, a curving main gallery connecting to variety of amenity spaces, all contribute to an important first impression experience. Partnering with the Art-in-Architecture program, the main entry, gallery, and amenity spaces will be enriched with unique art and monuments.

The reception area will be staffed during the campus operational hours. After hours, the admin/nursing staff will have the access to allow entry into the building.

- Café/Pub: The café opens up to the entry lobby, greeting the residents and visitors with a casual, hospitality environment with grab and go food and beverage station. The location of the café adjacent to the main entry will enhance the first impression and activate the main lobby area. The pub adjacent to the café provides another active culinary destination for residents, visitors, and staff. The pantry between the café and pub allows the serving staff to be shared between different times and services.
- Main Gallery: The main gallery connects different amenities as well as two elevators banks to the Long Term Care neighborhoods from the first floor and upper floors. As a main corridor of the main amenity floor, the main gallery serves as more than a corridor, but also a transient space to invite, socialize, discover, and entertain, displayed with clear wayfinding.
- Theater: The Theater allows for small movie screenings or small guest lecture events. The flat floor with the lounge seating allows for flexible seating arrangement for any occasion.

- Classroom: A classroom is provided to promote lifelong learning environment for residents and staff. This flexible space, divisible into two smaller spaces, allows different classes or activities to take place at the same time. The space will be available for use with outside groups to foster partnerships with the greater Quincy community.
- Barber/Beauty: This central barber beauty area serves as a destination for the campus. The service will be provided by an outside vendor to serve LTC residents on the first floor and campus residents from outside the LTC. Potential partnership opportunities with a local cosmetology school were discussed during programming phase.
- Administrative Suite: Placed off the main gallery, the administrative suite will serve the residents and visitors within close proximity. The preliminary list of offices will include ; Infection Control/Domiciliary Supervisor, Infection Control/In-service/Employee Health Supervisor, Psych Nurse, In-Service Coordinator, Staffing Coordinator, EHR/MDS Coordinator, in addition to the three offices to serve the nursing floors listed in the Neighborhood Amenity Central Office Section above (Director of Nursing, Assistant Director of Nursing, and 1st floor Supervisor). A workroom shall be provided with a printer/fax machine, water cooler, and refrigerator. The Using Agency may advise on the final layout of the space as they refine the staffing plan and the needs for the building.
- Chapel: The Chapel serves as a sacred space for worship services and gatherings, for a capacity of 15 people. Separate storage spaces for multiple denominations are provided. Immediate outdoor access with separate landscape garden is provided by the chapel. Overall lighting shall be soft and dimmable for controllability. Potential considerations for the water-fall or fountain with trickling water can create tranquil and peaceful environment. Chapel seating with a kneeler shall be provided. Larger services will take place in the existing chapel on the campus or in the Lippincott Hall building. Infrastructure for the televised services shall be accommodated.
- Walker/wheelchair storage off dining and main area along main gallery to be provided.

Basement Service

Providing maintenance and back-of-house services in a discrete manner is key to the successful operation of the LTC and campus. Durable finish materials are to be used, especially with corner guards and wall/door protections, to withstand damage from the carts and service equipment.

- Main Kitchen: The main existing kitchen in Nielson Building will be decommissioned and a new Main Kitchen will be provided in the basement of the LTC to serve the residents of the entire campus. Long term food storage will remain in Nielson Building. Refer to the kitchen narrative for the detail.
- Main Laundry: Central laundry is sized to serve the entire campus.
- Main pharmacy: Accessible only by staff with security clearance, the main pharmacy will provide medicine for the Long Term Care residents. Refer to the Security Control narrative for further access control information.
- Central storages will include building, housekeeping, grounds keeping, and resident storage per IDPH and VA's requirement.
- Staff support/amenities will take place in Nielson Building.
- Service/receiving will take place from Nielson Building to LTC building through an underground tunnel.

- Trash/recycling will be brought down from the each neighborhood into the trash holding area in the lower level, before being transported to the Nielson for the main trash holding area for the trash pick-up.
- Mechanical, electrical, and fire protection spaces will be provided.

Domiciliary

Design Principles and VA Requirement

Current Domiciliary residents occupy the Anderson Barracks and Sommerville Domiciliary. Upon completion of the masterplan in 2018, it was identified to renovate both Fletcher Infirmary and Markword Infirmary into each 40 unit Domiciliary buildings on campus. However, both existing buildings presented their own challenges with the existing structure, including ramps within the corridor, low floor to floor ceiling, and that they are not connected in terms of services and resident circulations. During the Functional Programming exercise, an alternate direction has been evaluated to demolish both buildings and build the new 80-unit Domiciliary that will be connected to the Nielson. After studying opportunities and challenges along with the cost and schedule implications, the Using Agency authorized the Bridging Team to pursue a new Domiciliary that is connected to the Nielson building in lieu of renovations of two existing structures.

Some of the opportunities of the new Domiciliary are identified as below;

- Unit sizes and layout can be right sized and customized for the needs of the campus.
- Floor to floor height can be adjusted to allow for the comfortable ceiling height.
- All amenities can be connected to the Nielson building for the direct support and services.
- The phasing and logistics can be simpler and provide opportunities to fast track the resident occupancy of the building, as the current Fletcher building currently sits empty and can be demolished without disturbing any current operation.
- The Domiciliary will be close to the new Long Term Care building and the central quad of the campus.
- Licensing is not required. (IBC R-2 occupancy) Smoke partition is provided for defend in place
- High sustainable goals including Net-Zero and passive house design can be employed to ensure the optimal performance of the building as well as to promote wellness of the residents and staff.

Net Zero Building Strategies

In order to achieve the Net-Zero goals for the Domiciliary, the combination of the following strategies can be further studied and employed.

- Super insulated continuous thermal envelope with limited thermal bridging, including continuous insulation below grade
- Air tight wall assembly
- High efficient lighting
- High efficient glazing
- Onsite renewable solar P/V
- High efficient mechanical
- LED lighting tied with daylight controls
- Individualized shading strategies per each facade

- Limiting window to wall ratio
- Water efficient plumbing fixture to reduce the boiler size
- Energy recovery system

Site Planning

The new Domiciliary sits along sloping grades amongst mature trees and rolling hills on the north-west portion of the campus quad. The planning of 80 unit in the 3-story to respect the surrounding context creates a lengthy building with long corridor. In order to reduce overall building length, the planning took advantage of the sloping site and placed a northern wing in the lower level with the full daylight. This design allowed for resident walk out patios for the lower level as an additional amenity. The design further created four different residential massing with the clear breaks. These breaks between the massing provide fully day-lit lounges and gathering spaces for the residents, while breaking down the scale of the building and resident corridor.

The community center is provided in the place of the existing link between Fletcher and the Nielson building. This allows for direct staff access and service from the Nielson Building to the new Domiciliary. It is also pulled away from the main residential building to allow for higher ceiling space for the main dining.

The Resident Survey

During schematic design phase, a meeting was held at Anderson building with residents of the current Domiciliary to understand their expectations and needs. The followings are the key take away from the survey results.

- The need for individual storage space.
- The need to have space in their room for their own furniture and no built-ins.
- The desire to have a designated space for reading, visiting, and/or games such as cards or board games.
- Residents expressed the desire to have laundry facilities on every floor.
- The need for more counter space/closet space in the units.

These comments have been integrated into the design of the units and amenity spaces.

Resident Units

The new Domiciliary will provide a combination of studios and one bedrooms with private bathrooms and small kitchenettes.

Based on the resident survey, the majority of the residents strongly prefer to dine in the main dining room with other residents rather than to have a full kitchen in the unit. The compact kitchenette in each unit provides the following: microwave/refrigerator combo, single bowl sink, and countertop for light snack preparation.

Resident bathrooms are preferred to be accessed from the bedroom.

The lower level units will be accommodated with private resident walk out patios.

Resident Floor

The overall planning of the resident floors was developed to provide intermittent breaks between the corridors to reduce the perceived length of the corridor. At each break, bench seating by a window niche and a den area is provided to offer small gathering space for each wing. Large windows allow for daylight and views across the space. A resident laundry room is located next to the den for residents' convenience.

At the end of each corridor, an outdoor terrace space with solar shading screening is provided. An alternate option will be to enclose this outdoor terrace to become a 3-season terrace.

Separate clean and soil linen rooms for each wing, a housekeeping storage, and a resident trash room with trash chute are provided for each floor.

Community Center and Amenities

- First Floor Community Center

- A main axis is created to connect the residential building with the Nielson building. The main entry for the new Domiciliary is closely located at the existing location of main entry for the Fletcher building, minimizing the road work around that area and maintaining a relationship with the existing parking lot. The first impression of the main resident lobby is a resident living room with soft seating and a fire place, which rises up to the third floor. A high volume space will allow for the ample daylight to penetrate, with strategically located sunscreen to avoid glare issues.
- A main admin office suite is located next to the main entrance, creating a visual connection to the entry and the living room. The admin area accommodates two private offices for a nursing staff and an exam room. Also, an additional seating area is provided for touch down flex office space, or can serve as a conference table.
- A classroom is located on the other side of the living room to accommodate small classes and activities. A corner sliding wall allows for the classroom to be open for any flexible use as an extension of the main lobby space.
- A fitness room is conveniently located close to the main elevator lobby. Basic fitness equipment and tools are provided, with the treadmills, elliptical and bicycle machines, and full mirrored wall and weight area. A therapy garden is designed to have direct outdoor access from the fitness room.
- Overlooking a beautiful lawn and mature trees, the main dining area provides a destination for the Domiciliary residents. It is a space where many social gatherings and activities can take place, beyond dining. The culinary layout allows for cafeteria style serving during the meal time. An additional residential kitchen is provided for resident's use, allowing for dining options. The pantry is located adjacent to the Nielson Building for efficient meal delivery and service. A condiment station and snack area will be available for residents between the meal times. The dining room provides various seating arrangements and a fire place with lounge seating, activating the space.
- A covered walkway provides a protected connection from the dining room to the Long Term Care building.

- **Third Floor Lounge**

A den space is provided on the top floor as a destination and social gathering space. An adjacent outdoor terrace is provided off the den to promote additional visual and outdoor connection to the campus.

Building Service/Storages

In addition to the resident units, lower level provides the main building support and storage needs, including bicycle and resident storage.

Renovations

Nielson Dining (Major Renovation)

Currently, Nielson Dining building functions as a main dining hall with the main kitchen to serve the entire campus. As the main kitchen and dining will be decommissioned from the Nielson and relocated to the new LTC, the Nielson building will be renovated to serve as the main service loading/receiving and main storage area, as well as to provide a new hub for the staff lounge and amenity space. A new staff parking is configured adjacent to the Nielson for convenience.

Therapy Building (Minor Renovation)

The Multi-Therapy building will receive a minor renovation to provide a front entry and a new elevator/stair tower to be accessible from the road. The new elevator and stair will also connect to the lower level corridor to be created between the new Long Term Care building, to allow for the residents from the LTC and the Fifer to allow for the indoor access to the Therapy building, ADA/IAC access to the therapy building must be maintained throughout construction.

Fifer Skilled Nursing (Minor Renovation)

The Fifer building will receive a minor renovation to connect to the Multi-Therapy building as well as to new Long Term Care through indoor corridor, accessible from the Lower Level. Care must be given to ensure the full operation of the building as well as utility infrastructure throughout the construction.

Andrews Infirmary (Minor Renovation)

Upon demolition of the Schapers Hospital, the connector between the Andrew and Schapers Hospital will need to receive the minor renovation to close off the connector. Care must be given to ensure the full operation of the building as well as utility infrastructure throughout the construction.

Sustainability and Healthy Environment

Design Approaches to Sustainability and Healthy Living

As an institution that is built on the State's and Veterans Affairs' (VA) resources, we owe it to the public and veterans that we create responsible and healthy environments which represent the commitment to sustainability for both the State of Illinois and VA.

From the masterplan phase, it was clearly identified by the IDVA and CDB that this new development shall promote the state-of-the-art environment that will lead the charge for other states and VA campuses to follow. This admirable goal can be realized when every entity on this project has the early buy-in and follow through the clear set of paths.

As a result, the following sustainable strategies with opportunities and challenges have been closely reviewed with the Using Agency, which ultimately guided the current bridging design approaches.

LEED (Leadership in Energy and Environmental Design)

As a basic measure of the sustainability goals set out by the state and the VA, the projects will pursue LEED V. 4 Gold or higher Certification (the minimum LEED V.4 Silver Certification is required). The LEED checklist document multiple points in the MAYBE category that could be used as alternate strategies to achieve the desired results.

WELL Strategies (International WELL Building Institute TM)

While LEED has gained significant momentum in the building industry with its focus on more broad aspects of sustainability such as energy efficiency and sustainable sites, the WELL Building Standard has been created to specifically address human-centered design and operational strategies for the health, happiness, and quality of life for people. In addition to improving the physical environment, WELL is designed to empower positive human behaviors; the way we eat, sleep, exercise, and feel. The WELL Building Standard is based on the seven concepts – Air, Water, Nourishment, Light, Fitness, Comfort, and Mind.

The projects currently are not actively pursuing the certification. However, continued discussions on the design and operational enhancement to provide a healthier environment for the residents and staff as well as transformation of the campus image should be encouraged throughout the Design Build process.

The following WELL strategies have been identified for priority considerations as they relate to the healthy environment and water quality for the campus.

- A12. Air Filtration : "A12.1 / 1 Points Implement Particle Filtration"
- A14. Microbe and Mold Control : "A14.2 / 1 Points Manage Condensation and Mold"
- W01. Fundamental Water Quality : ALL POINTS
- W02. Water Contaminants : ALL POINTS
- W03. Legionella Control : "W03. 1 Implement Legionella Management Plan"

For further information, please refer to Owner Project Requirement (OPR).

Biophilic Design Concept

Biophilic design applies the concept of biophilia (the human love for life and life-like properties) to architecture, helping us understand how and why design affects our brains, bodies, and emotions. Throughout the design process, elements of biophilia have been incorporated into the design, including connection with the surrounding nature and light. The following are general concept of biophilia that can be further implemented.

- Exploration and Discovery
- Natural Materials
- Movement and Unpredictability
- Light
- Connection to Nature
- Connection to Others
- Spatial Experiences
- Variety and Difference

Passive House Design

Passive House design principles consist of design strategies to attain a quantifiable and rigorous level of energy efficiency based on the regional and climate context. By providing a high performance building envelope, the principles minimize the energy load for the building, enabling reduced mechanical units, creating comfortable indoor environment for the residents, and offering the best path to Net Zero buildings. In addition, a thermally tight building envelope will assist with resiliency and emergency preparedness.

Despite an increased air change requirements for the Long Term Care and Domiciliary, the Passive House design principles will benefit the overall energy use through the following strategies.

- Employs continuous insulation throughout its entire envelope without any thermal bridging.
- The building envelope is extremely airtight, preventing infiltration of outside air and loss of conditioned air.
- Employs high-performance windows (double or triple-paned windows depending on climate and building type) and doors - solar gain is managed to exploit the sun's energy for heating purposes in the heating season and to minimize overheating during the cooling season.
- Uses some form of balanced heat- and moisture-recovery ventilation.
- Uses a minimal space conditioning system.

Bird Friendly Design

As the campus is situated within a beautiful natural surroundings, it is more important to be mindful to reduce the risk of bird injury and mortality from collisions into the new building façade. Follow industry's best practices and guidance for the bird friendly design, including USGBC's LEED V.4 Pilot Program: Bird collision deterrence

Additional Sustainability Criteria

The bridging team has considered additional following sustainable design strategies.

- AIA 2030 challenge encourages the EUI (Energy Use Intensity) level to be 80% reduction compared to the baseline (based on the year 2020). **Based on the preliminary analysis of the EUI's for both building, the EUI targets for LTC to be 80% reduction and the Domiciliary to be 100% reduction/net zero.**
- International Energy Conservation Code (IECC) 2018 provides the higher set of energy goals as a baseline.
- Daylight simulations and energy modeling identify any increased energy load, heat gain, and glare issues, which have been integrated as a part of the exterior shading strategies. (See below)
- According to Resilient Design Institute, *“Resilience is the capacity to adapt to changing conditions and to maintain or regain functionality and vitality in the face of stress or disturbance. It is the capacity to bounce back after a disturbance or interruption.”* Resilient Design is important aspect of the design more than ever, especially with the frailer populations on campus. The campus has the resilient strategies and protocols in place, and the design is to support the resilient design with generator and passive house design strategies. Additional back-up power for the Generator capacity and fuel tank capacity also contribute to the resiliency for the campus.
- Based on the preliminary analysis of the energy loads for both Long Term Care and Domiciliary building, it was determined to pursue **Net Zero energy for Domiciliary**, with reduced EUI based on the passive house strategies and renewable energy source (photovoltaic).
- Initial life cycle cost analysis has been evaluated when selecting preliminary HVAC systems for the new buildings and renovation of the existing building. Design-Build team shall provide life cycle cost analysis to assist with the final system selection for the Using Agency.
- CDB has engaged a third party Commissioning Agent to be involved in the project from the early design to carry the sustainable strategies and systems performance commissioning throughout the project. The Commissioning Agent has provided the Owner's Project Requirement and Basis of Design document. They will further provide the third party commissioning scope of services on behalf of the Owner. (Ramu to confirm the scope).

Solar Shading and its impact in Thermal Comfort and Energy Savings

In the design of the Domiciliary and Long Term Care buildings, it is important to account for solar protection on the exterior of the buildings while retaining views. In order to reduce heat gains and glare disturbance, exterior solar shading should be included as part of the building envelope, protecting the interior spaces during the hot seasons of the year. By providing shading, heat stress will be reduced and mechanical cooling loads will be significantly lower. At the same time, the shading devices will reduce direct glare potential inside the building, minimizing the discomfort and disturbance generated by direct solar radiation impacting a person's visual field. Proper façade and shading design can provide many benefits for the project. With careful design and analysis, the façade shading can reduce operating costs, first costs, reduce energy use, and improve occupant satisfaction within the building.

- **Reduced Glare and Improved Visual Comfort**
Though bright light during the day is conducive to good health, uneven levels of brightness in the visual field can cause visual fatigue and discomfort. Glare, or excessive brightness, is caused by light scattering within the eye (intraocular scattering), thereby creating a “veil” of

luminance that reduces the luminance contrast as received by the retina. In buildings, the biggest source of glare comes from sunlight directly hitting the eye or reflective surfaces. Older adult populations are especially sensitive to glare because the light will scatter more in aging eyes to see less detail and glare can obscure objects in the room.

Excess glare can create stress and reduce productivity of occupants. Shading limits the amount of surfaces that direct solar radiation can hit, therefore reducing potential issues with glare and avoiding the occupant stress and dissatisfaction that may be associated with glare. Without appropriate external shading, occupants are likely to draw the blinds at most or all times, negating the benefits of daylight.

- **Reduced Building Cooling Needs and Energy Usage**

Solar radiation affects internal surface and air temperatures, which puts additional loads on the mechanical system causing more energy to be used to maintain internal comfort. External shading blocks solar radiation from entering the building, therefore reducing the building's cooling loads and energy consumption needs.

Appropriate daylighting can also reduce building energy use. Lighting loads can account for as much as 20% of a building's energy consumption. Daylighting in combination with lighting systems that include daylight dimming systems can provide substantial savings in energy.

- **Improved Thermal Comfort**

Transmitted solar radiation can cause discomfort if it falls directly on an occupant. A person sitting near a window in direct solar radiation can experience heat gain equivalent to 20 degree Fahrenheit rise in mean radiant temperature. By blocking direct radiation, occupant comfort can be improved.

- **Integrated Design and Durability**

Fins and louvers shall be of materials that are easily cleanable and maintained, with durable and warranted finishes. The shading elements shall be engineered to resist wind and snow loads and fasteners for attachment to be indicated on shop drawings. In addition, exposed ledges shall be designed or treated to minimize dirt collection over time

- **Shading Design Strategies**

There are two metrics used to measure the impact of daylight autonomy and glare potential in a space, and those metrics are SDA (Spatial Daylight Autonomy) and ASE (Annual Solar Exposure). Spatial Daylight Autonomy is a metric describing annual sufficiency of ambient daylight levels in interior environments. It is defined as the percentage of an analysis that meets a minimum daylight illuminance level for a specified fraction of the operating hours per year. Per LEED standards in order for a space to be considered completely daylight autonomous, 75% of the occupied area should meet or exceed 300 lux (28 Foot-candles) for at least 50% of occupied hours. On the other hand, ASE is a metric that describes the potential for visual discomfort in interior work environments. It is defined as the percentage of an analysis area that exceeds a specified direct sunlight illuminance level more than a specified number of occupied hours per year. Per LEED standards, a maximum of 10% of the occupied area should be exposed to more than 1000 lux (93 Foot-candles) of direct sunlight for more than 250 hours per year. The shading strategies were implemented to both buildings in the following sections.

- Long Terms Care Building Shading Strategies

An initial daylight analysis without any shading was run for the Long Term Care Building and for the Domiciliary building, in order to establish a baseline. Each room and each façade has a different solar incidence, and therefore requires a specific treatment in order to mitigate glare and maximize daylight autonomy. Multiple residential rooms and common areas, facing different orientations, were analyzed for both Daylight Autonomy and Glare Potential. Even though all of the rooms in the Long Term Care Building were above the 75% SDA threshold, some of the spaces presented elevated ASE levels, reaching levels of up to 45% which could represent unwanted heat gains and glare disturbance. Once the baseline for each building façade was established, a combination of multiple depths for horizontal and vertical shading devices were tested with the purpose of dropping ASE values below the 10% threshold, while keeping SDA levels above 75%. For the Long Terms Care building, the most critical areas are the rooms on the south wing facing South, with ASE levels of 30%, and the rooms on the north wing facing Southwest, with ASE levels of 44%. For the south facing facades located in the south wing of the building, a 18" deep vertical and horizontal louvers attached to the window mullions and 47% Visible Light Transmittance windows were introduced in order to mitigate glare and drop ASE levels. By applying these strategies, ASE dropped from 30% to 10%, while SDA dropped from 100% to 83%. For the Southwest facing units, located in the north wing of the building, 18" deep horizontal and vertical louvers were attached to the window frame, and 38% Visible Light Transmittance windows were introduced in order to mitigate glare and drop ASE levels. Added to that, 12" interior light shelves should be used in order to provide shading to the room and reflect diffuse daylight to the ceiling of the room. By applying these strategies, ASE dropped from 30% to 10%, while SDA dropped from 44% to 15%.

The common areas of the building are other critical spaces in terms of solar protection due to the high amount of glass and southern and western orientation. Similar to what happens in the residential portions of the project, the common areas have an outstanding performance in terms of daylight autonomy (SDA), but the Glare levels (ASE) are considerably high, and therefore solar protection strategies should be implemented in order to reduce unwanted heat gains and overlit spaces.

Storefronts at ground level are protected by deep overhangs that provide shading to the interior spaces and at the same time allow for outdoor areas of respite and gathering to occur. On the other hand, glazing with a considerably low Visible Light Transmittance (31%) allow for light to enter these spaces, without the disturbance generated by direct solar exposure. By adopting this, ASE levels at the ground floor go from 70% to 23%, while SDA stays stable at 100%.

Finally, the curtain walls located above ground level are designed with serrated façade to position the glazing away from the direct western exposure. The use of a micro perforated screen applied to the south and west facing glazing will protect the interior space from direct solar exposure, while clear glass can be maintained on the other side of the serrated glass to allow for the unfiltered views of the campus.

Various LTC Building Performance Values for each of the residential unit facades has been tested, with the results in the table below. The highlighted scenarios per each façade, employing the exterior shade along with the Visual Light Transmittance (VLT) factor for the glazing has resulted in the optimal indoor environment. These strategies have been integrated into the final exterior building design.

ROOM	VLT	INTERIOR SHELF DEPTH	SHADE DEPTH	DAYLIGHT (SDA)	GLARE (ASE)
South Facing	47%	0 FT	1 FT - 6 IN Vertical+Horizontal	100%	30%
South Facing	47%	0 FT	1 FT - 6 IN Vertical+Horizontal	80%	16%
South Facing	47%	1 FT	1 FT - 6 IN Vertical+Horizontal	80%	15%
South Facing	47%	2 FT	1 FT - 6 IN Vertical+Horizontal	82%	14%
East Facing	47%	0 FT	1 FT - 6 IN Horizontal	95%	15%
East Facing	47%	0 FT	1 FT - 6 IN Horizontal	78%	4%
East Facing	47%	1 FT	1 FT - 6 IN Horizontal	79%	4%
East Facing	47%	2 FT	1 FT - 6 IN Horizontal	79%	3%
West Facing	38%	0 FT	0 FT	85%	44%
West Facing	38%	0 FT	1 FT - 6 IN Vertical+Horizontal	85%	24%
West Facing	38%	0 FT	1 FT - 8 IN Vertical+Horizontal	83%	23%
West Facing	38%	1 FT	1 FT - 6 IN Vertical+Horizontal	82%	20%
West Facing	38%	2 FT	1 FT - 6 IN Vertical+Horizontal	84%	15%
Courtyard - South Facing	47%	0 FT	0 FT	100%	22%
Courtyard - South Facing	47%	0 FT	1 FT - 6 IN Horizontal	71%	11%
Courtyard - South Facing	47%	1 FT	1 FT - 6 IN Horizontal	67%	11%
Courtyard - South Facing	47%	2 FT	1 FT - 6 IN Horizontal	61%	10%

= Recommended Strategies

- Domiciliary Building Shading Strategies

The daylight performance of the Domiciliary building is significantly better compared to the Long Term Facility building. The only façade of the building that represents a challenging condition in terms of solar heat gains and glare potential is the Southwest façade. If no shading strategies are applied to this face of the building, ASE levels will be close to 33%, which is considerable high for a residential room. In order to reduce the overlit areas of the residential

units, one horizontal 18" exterior louver and one vertical 18" exterior louver should be attached to the window frame. Added to that, an interior 12" light shelf should be used to reflect diffuse light inside the room. Finally, a 47% Visible Light Transmittance window should be used in order to mitigate glare disturbance. The other face of the building that will require shading strategies is the southeast façade. Even though the baseline without shading performs relatively well, by adding a 12" deep vertical and horizontal shading louver will reduce ASE Glare levels to 10%. The rest of the facades will not require any kind of shading or light shelves strategies. Finally, in the common areas, the terracotta baguettes have a considerable contribution in terms of reducing glare disturbance. While the lobby, without any protection at all, has a dramatically poor performance, with ASE levels close to 74%, at the moment of inserting baguettes 12" spaced from each other, glare will drop to 0%.

The following table indicates the Domiciliary Performance Value, as in LTC simulations. The highlighted shading strategies have been integrated in the final Domiciliary fenestration design.

ROOM	VLT	SHELF DEPTH	SHADE DEPTH	DAYLIGHT (SDA)	GLARE (ASE)
South Facing	47%	0 FT	0 FT	100%	30%
South Facing	47%	0 FT	1 FT Vertical+Horizontal	80%	16%
South Facing	47%	0 FT	1 FT - 6 IN Vertical+Horizontal	80%	15%
South Facing	47%	1 FT	1 FT - 6 IN Vertical+Horizontal	82%	14%
South Facing	47%	2 FT	1 FT - 6 IN Vertical+Horizontal	80%	15%
South Facing	47%	2 FT	1 FT - 6 IN Vertical+Horizontal	82%	14%
West Facing	47%	0 FT	0 FT	100%	30%
West Facing	47%	0 FT	1 FT - 6 IN Vertical+Horizontal	80%	16%
West Facing	47%	0 FT	1 FT - 6 IN Vertical+Horizontal	80%	15%
West Facing	47%	1 FT	1 FT - 6 IN Vertical+Horizontal	82%	14%
West Facing	47%	2 FT	1 FT Vertical+Horizontal	80%	15%
West Facing	47%	2 FT	1 FT - 6 IN Vertical+Horizontal	82%	14%

= Recommended Strategies

Interior and Lighting Design

Interior Design

The overall goal of interior design for veterans is to provide an environment that does not feel institutional. Even the most acute level of care in a Long Term Care facility must not feel sterile or hospital-like; it is the resident's home, not a place he or she has gone for a short stay before returning home.

The key theme is "feeling". Rooms should feel residential, with the style and quality of a hotel and the comforting details of a home. The design must incorporate a variety of spaces that support varying levels of contact, such as large-scale spaces for holidays or special events, and small cozy spaces for family gatherings and quiet times.

Common overarching goals include providing:

- A safe, comfortable environment that is supportive of the resident's need to maintain independence
- Design that seamlessly incorporates the necessary support devices (such as grab bars and handrails) in an unobtrusive manner
- An interior environment that avoids the institutional stigma associated with traditional medical and hospital settings
- A design that addresses the six characteristics of aging that have the largest impact on both veterans and older adults' relationship to their environment: loss of balance; cognitive impairment; loss of strength; visual impairment; hearing impairment; and increased sensitivity to cold, drafts, and direct sunlight
- A variety of types and sizes of spaces supporting veteran individual needs, lifestyles, and personalities

Although there are many different types of living and care environments for our veterans, there are some key factors to keep in mind for all interior spaces designed to meet the needs of our veterans of all ages and abilities:

- Install evenly distributed non-glare lighting with appropriate footcandle(fc) levels specific to tasks by area. (Refer to the lighting design guidelines below).
- Provide contrast between the horizontal and vertical planes to provide better visual discrimination that will improve the sense of balance. For example, a corridor whose floor and wall finishes were a similar color and value was perceived by the residents of one facility as a "muddy river".
- Be sensitive to acoustics when designing and selecting finishes; choose those that reduce background noise for improved hearing at social gatherings.
- Flush transitions from one flooring material to another are vital. Plan for slab recesses to reduce trip hazards.

- Avoid sharp corners or edges in millwork, wood trim, furniture, hardware, and other interior elements. Choose flooring products that have patterns without high contrast and with colors close in value. Otherwise there is the potential for vertigo and falls.
- Select textiles and wallcoverings with easily recognizable patterns that will not be perceived as objects, faces, or animals.
- Specify colors that are not so dark that they are perceived as black or so subtle that they appear dreary to the aging eye.
- Choose floor finishes that are not slippery or have a high-gloss appearance.
- Install carpets with fiber construction and moisture-barrier backing systems appropriate for the aging population with incontinence.
- Limit use of mirrors on walls to create the illusion of space, as this can cause confusion and disorientation.
- D-B to provide cleaning and maintenance instructions on all specified and installed finishes. D-B to coordinate instructional maintenance training with support staff for specialty finishes.
- Choose materials that are durable, easy to clean, and with 20 year life cycle.

Lighting Design

The following points are essential to the design of a successful lighting system for any veterans' space:

- Even distribution of light levels on the floor surface so as not to create visual barriers of dark and light spots
- Non-glare light sources
- Appropriate light levels for the aging eye – footcandle levels 15-20 percent higher than for younger adults
- Consistent light levels from one area to the next to accommodate the slower adjustment of the older eye to high contrast
- Provision of transition areas to give the eye time to adjust to spaces with different levels of light

The “ANSI/IES RP-28-16 Revised Lighting and the Visual Environment for Seniors and the Low Vision Population” also can provide a good resource to determine the recommended light levels for different spaces and the height of the light measured. Design-Builder is recommended to review and take the stringent approach for the lighting design by comparing the ANSI/IES RP-28-16 and the best practice considerations for different areas described below.

- Commons

- Dining areas should have light levels as high as 50 fc so the residents will be able to clearly see the color of the food. One of the better light sources is indirect because it minimizes glare and shadows.
- Accessory lighting in lounge spaces should be considered supplemental to general light levels of a minimum of 35 fc.
- There should be general illumination of approximately 30 fc with directed task-lighting over the table or floor lamps at the proper height next to seating in library spaces.

- Barber and beauty salons should have indirect lighting with some decorative sconces. Lighting on both sides of the mirror creates the most even light for viewing the face. Special attention should also be given to the color of the lamps, so as to provide the most flattering quality of light.
- Physical therapy spaces also use indirect lighting. Many residents undergo therapy in these spaces and will spend their time laying on mats looking up.
- **Corridors**
 - Code-stated footcandle requirements are minimum goals. Successful fc levels of corridors in Long Term Care facilities are typically ranging from 30-45 fc (as defined by positive resident feedback).
 - Variation in light source is a key design element to help visually shorten the length of corridors. The integration of lighting with architectural features creates visual cueing to support wayfinding and areas of interest along the resident's trip down a corridor. To accomplish desirable light levels, two recessed LED downlights should be spaced six feet on center.
 - Decorative sconces placed at unit entries not only serve as wayfinding elements, but also provide supplemental lighting for residents to find their keys, read the room number, and locate the keyhole.

Concept Furniture, Fixtures and Equipment ('FF&E') package narrative for Bridging Documents

Inclusions and Exclusions

- The following is a general summary of the types of items that have been included in the FF&E budget: Interior furniture, exterior furniture, equipment (as noted on equipment tabs), contingency, delivery, installation, assembly, accessories, artwork (printed art and some originals only), decorative window treatments and accent pillows.
- The FF&E spreadsheet includes 'EQUIPMENT' tabs that list items that will be specified and purchased by the IDVA as the Using Agency. This narrative describes responsibilities to receive, coordinate and install these items.
- The following are items are excluded from the FF&E package:
 - Monumental artwork that would be included in Art-in-Architecture program.
 - Kitchen equipment that is carried in food service / culinary project specifications.
 - Building signage, exterior signage, and donor signage, apart from interior room and directional signage, specialty dining signage that are described in the architectural specifications.
 - The FF&E package identifies shelving for coordination purposes. However, any shelving that is fastened to and supported off walls shall be supplied and installed by the D-B.

Approval protocol:

The following shall be presented to the CDB and Using Agency to gain written approvals prior to purchase.

- All fabric and treatment material finish samples.
- All furniture styles and selected sample pieces per the narrative below
- A binder including the product data, manufacturer and vendor contact information, and physical samples of all materials and fabrics, such as that required by the IDPH, shall be created and stored on site for use during the final inspections by IDPH and the USDVA.
- An electronic version of the same shall be presented to the CDB as part of close-out documentation.

Narrative requirements and performance specifications

The following narrative describes the quality and performance standards required of the items in the FF&E package.

1. All furniture, fabrics, and window treatments to be commercial healthcare / senior living quality.
2. All furniture styles and design shall be coordinated with the interior design aesthetic and palette, and shall be presented for approval.

3. All artwork to be installed with security mount hardware.
4. All lounge chairs, sofas, benches, dining chairs, outdoor chairs, stacking chairs, task chairs, and bar stools to have arms. The arms must extend to the front of the seat so that they will support the weight of residents who lean on them in order to stand or sit unassisted.
5. Lounge Seating to meet the safety and performance requirements for ANSI/BIFMA X5.4.
6. Office chairs to meet the safety and performance requirements for ANSI/BIFMA X5.1.
7. All drapery to meet NFPA 701.
8. All seating and office furniture to meet:
 - a. The industry-approved emissions requirements for low-emitting seating and office furniture products for ANSI/BIFMA X7.1.
 - b. The standard test method for determining VOC emissions for ANSI/BIFMA M7.1.
9. All furniture to be able to be cleaned per the BIFMA HCF 8.1 healthcare furniture design guidelines for cleanability.
10. All lounge seating to fall within the following dimensions: 18-19" seat height, 20-22" maximum seat depth, 25-26" arm height. All dining seating to fall within the following dimensions: 18-19" seat height, 20" maximum seat depth, 25-26" arm height. All dining tables to fall within the following dimensions: 36" for a 2-top, 42" for a 4-top, 60" round for a 6-top.
11. All fabric will be treated with a moisture barrier backing and a stain resistant finish.
12. All office furniture to be 3rd party Level certified (environmentally preferable and socially responsible).
13. The density and firmness of the cushions on the upholstered furniture, must be supportive so that the bottom of the seat will not sink much lower than the height of the occupant's knees.
14. Furniture to be placed in rooms with multiple functions and flexibility, such as stackable chairs, need to be light enough for the occupant to move while still providing a safe stable frame with arms that will not tip over when the seated person tries to rise. Tables that fold need to have mechanisms that lock in place for stability without any sharp edges or moveable parts that can cut and pinch when set in place.
15. It is assumed that all interior design, coordination, and installation fees are included by the Design-Builder as part of the larger Design-Build fee.

Mock-up and physical samples

1. All dining chair, multipurpose room chair, and office chair options to be provided to the Using Agency as sample chairs for testing prior to selection. A variety of 3-4 samples per area noted will be provided for a sit test.
2. Physical samples of other items may be requested by the Using Agency to assure themselves of long-term performance, for example, dining tables.
3. All furniture items within a resident room shall be presented for inspection and approval prior to purchase. This is intended to ensure that the veteran resident comfort, staff operations and long term durability of the pieces is at the forefront of the design and installation process.

Design and Installation Responsibility Assignments

The following are general requirements for the design, specification, purchase and installation of FF&E items. The responsibility assignments are included in the spreadsheet.

- **Design:** The Design-Builder (D-B) shall be responsible for the design and specification of the elements that comprise the FF&E Package. These shall meet or exceed the narrative standards.
- The D-B will coordinate the design with the Illinois Department of Veterans' Affairs (DVA) which is the Using Agency and Capital Development Board (CDB).
- The D-B shall create a spreadsheet of items and costs and assist the CDB in creating the purchase orders for the FF&E package.
- The D-B shall indicate on drawings all items that shall be fastened or attached to walls for coordination purposes and to assist the D-B in providing blocking and reinforcement as required in the structure.
- **Purchase by Using Agency:** The final order for purchase of all DOM and LTC FF&E, Equipment and Movables shall be placed by the Using Agency.
- **Install:** It shall be the Design-Builder's (D-B) responsibility to receive, store and install the FF&E and Equipment package in its entirety. The D-B shall be responsible for the reinforcing or blocking required in walls and ceilings or structure to receive the same.
 - Clarification on shelving: While all shelving is indicated for coordination, any shelving that is fastened to and supported off walls shall be supplied and installed by the D-B.

Storage Requirements:

The D-B shall make arrangements to receive, inspect, store, protect, and install the material.

- The material thus stored shall be protected from extreme temperature and humidity variations and shall be held in conditioned storage areas to ensure long term durability in compliance with CDB requirements and manufacturers' storage recommendations.
- The materials if held in storage prior to delivery and installation, shall be inspected on delivery to ensure they are in good condition to avoid delays during the actual installation at a later date.
- The items shall be packaged during storage to protect them from dust, moisture and such damage.
- The D-B shall follow all CDB requirements for the protection, proper-storage, insurance and documentation of stored materials.

FFE Budget - Quincy
Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
LOWER LEVEL									
XXX	Outdoor Terraces	8	Dining Chair						
		2	Table - 42" Sq						
		5	Lounge Chair						
		3	Side Table						
XXX	Corridors	4	Lounge Chair	Valance	2	Artwork	23		
		2	Side Table						
XXX	Laundry Den	2	Lounge Chair	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
XXX	Den	2	Lounge Chair	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
		1	Credenza						
XXX	Resident Studio Unit	2	Desk	Valance	6	Artwork	6		
	2 units	2	Dresser	Bedspread	2				
		2	Bedside Table	Shower Curtain	2				
		2	Desk Chair						
		2	Recliner						
		2	Full Bed						
		2	Table - 36" Sq						
		4	Arm Chairs						

FFE Budget - Quincy
Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
		4	Terrace Lounge Chair						
		2	Terrace Side Table						
XXX	Resident 1 Bed Unit	5	Desk	Valance	20	Artwork	25		
	5 units	10	Dresser	Bedspread	5				
		10	Bedside Table	Shower Curtain	5				
		5	Desk Chair						
		5	Recliner						
		5	Full Bed						
		5	Lounge Chair						
		5	Table - 36" Sq						
		10	Arm Chairs						
		5	Loveseat						
		5	Coffee Table						
		5	Side Table						
		10	Terrace Lounge Chair						
		5	Terrace Side Table						
LOWER LEVEL TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
LEVEL 1									
XXX	Living Room	4	Wing Back Chair	Pillows	6	Artwork (installation)	1	Accessories	10
		4	Side Table	Drapery	4	Artwork (fireplace)	1	Faux Plants - Med	2
		1	Coffee Table					Table Lamp	4
		1	Sofa						
		1	Ottoman						

FFE Budget - Quincy
Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
		1	Hotel Cart						
XXX	Entry	1	Bench			Artwork	1		
XXX	Classroom	12	Stacking / Nesting Chair	Valance	2				
		6	Flip Top Table						
		1	Tackboard / Markerboard						
XXX	Dining	42	Dining Chair	Pillows	4	Artwork	25	Accessories	10
		4	Table - 36" Sq	Drapery	4	Artwork (fireplace)	1	Arrangement	12
		7	Table - 42" Sq					Planters	3
		1	Table - 60" Rd						
		4	Wing Back Chair						
		2	Side Table						
		1	Coffee Table						
		7	Island Chair						
		1	Podium w/ Casters						
XXX	Outdoor Dining	24	Dining Chair						
		5	Table - 42" Sq						
		2	Table - 36" Sq						
		5	Umbrella w/ Weighted Stand						
		2	Trash Receptacle						
XXX	Wellness / Fitness	2	Stacking Chairs						

FFE Budget - Quincy
Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
XXX	Offices	2	L-Shape Desk	Valance	4	Artwork	10	Faux Plants - Small	3
		2	Task Chair					Faux Plants - Med	1
		2	Bookcase					Table Lamp	2
		4	Lounge Chair					Accessories	10
		8	Guest Chair						
		2	File Ped - BBF						
		2	Side Table						
		1	Table - Round 42"						
		2	Keyboard Tray						
		2	Pencil Tray @ Built-ins						
XXX	Corridors	2	Lounge Chair	Valance	4	Artwork	56		
		1	Side Table	Drapery (@ elevator)	2	vintage objets)	7		
				wellness)	2				
XXX	Laundry Den	2	Lounge Chairs	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
XXX	Den	2	Lounge Chairs	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
		1	Credenza						
XXX	Public Restrooms	2	Display Shelves			Artwork	2	Accessories	10
								Faux Plants - Small	2
XXX	Resident Studio Unit	10	Desk	Valance	30	Artwork	30		

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Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
	10 units	10	Dresser	Bedsread	10				
		10	Bedside Table	Shower Curtain	10				
		10	Desk Chair						
		10	Recliner						
		10	Full Bed						
		10	Table - 36" Sq						
		20	Arm Chairs						
XXX	Resident 1 Bed Unit	13	Desk	Valance	52	Artwork	65		
	13 units	26	Dresser	Bedsread	13				
		26	Bedside Table	Shower Curtain	13				
		13	Desk Chair						
		13	Recliner						
		13	Full Bed						
		13	Lounge Chair						
		13	Table - 36" Sq						
		26	Arm Chairs						
		13	Loveseat						
		13	Coffee Table						
		13	Side Table						
LEVEL 1 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
LEVEL 2									
XXX	Outdoor Terraces	8	Dining Chair						
		2	Table - 42" Sq						

FFE Budget - Quincy
Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
		5	Lounge Chairs						
		3	Side Tables						
XXX	Corridors			Valance	4	Artwork	56		
				Drapery (@ elevator)	2				
XXX	Laundry Den	2	Lounge Chairs	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
XXX	Den	2	Lounge Chairs	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
		1	Credenza						
XXX	Resident Studio Unit	10	Desk	Valance	30	Artwork	30		
	10 units	10	Dresser	Bedsread	10				
		10	Bedside Table	Shower Curtain	10				
		10	Desk Chair						
		10	Recliner						
		10	Full Bed						
		10	Table - 36" Sq						
		20	Arm Chairs						
XXX	Resident 1 Bed Unit	15	Desk	Valance	60	Artwork	75		
	15 units	30	Dresser	Bedsread	15				
		30	Bedside Table	Shower Curtain	15				
		15	Desk Chair						
		15	Recliner						

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Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
		15	Full Bed						
		15	Lounge Chair						
		15	Table - 36" Sq						
		30	Arm Chairs						
		15	Loveseat						
		15	Coffee Table						
		15	Side Table						
LEVEL 2 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
LEVEL 3									
XXX	Outdoor Terraces	8	Dining Chair						
		2	Table - 42" Sq						
		5	Lounge Chairs						
		3	Side Tables						
XXX	Corridors			Valance	4	Artwork	56		
				Drapery (@ elevator)	2				
XXX	Laundry Den	2	Lounge Chairs	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
XXX	Den	2	Lounge Chairs	Valance	1	Artwork	3	Accessories	2
		1	Side Table					Faux Plants - Small	1
		1	Credenza						

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ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
XXX	Living Room	2	Lounge Chairs	Drapery	2	Artwork	3	Accessories	10
		2	Side Table			Artwork (@ fireplace)	1	Faux Plants - Small	2
		1	Ottoman						
		4	Terrace Chair						
		1	Table - 42" Sq						
XXX	Resident Studio Unit	10	Desk	Valance	30	Artwork	30		
	10 units	10	Dresser	Bedsread	10				
		10	Bedside Table	Shower Curtain	10				
		10	Desk Chair						
		10	Recliner						
		10	Full Bed and Mattress						
		10	Table - 36" Sq						
		20	Arm Chairs						
XXX	Resident 1 Bed Unit	15	Desk	Valance	60	Artwork	75		
	15 units	30	Dresser	Bedsread	15				
		30	Bedside Table	Shower Curtain	15				
		15	Desk Chair						
		15	Recliner						
		15	Full Bed and Mattress						
		15	Lounge Chair						
		15	Table - 36" Sq						
		30	Arm Chairs						
		15	Loveseat						

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Domiciliary

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
		15	Coffee Table						
		15	Side Table						
LEVEL 3 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
BUILDING TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	

DVA TO POPULATE AND EDIT									
DOM						UA	DB	UA	DB
APPLIANCES/EQUIPMENT		TAG	IMAGE	DESCRIPTION		SUPPLIED BY:		INSTALLED BY:	QTY
CARTS & CLINICAL									
	SUPPLY CART					x		x	1
DINING									
	FOOD SELECTION SIGNAGE						x	x	1
	SHELVING						x	x	8
	SHELVING						x	x	10
	TRANSPORT CARTS FOR HOT FOOD						x	x	8
	TRANSPORT CARTS FOR COLD FOOD						x	x	4
	ICE MAKER						x	x	1
	SAUTE PANS					x		x	12
	STOCK POTS					x		x	10
	SAUCEPANS					x		x	10
	BAKING SHEETS					x		x	40
	BAKING PANS					x		x	40
	TONGS					x		x	120
	SPATULAS					x		x	30
	LADLES					x		x	20
	CHEF'S KNIVES					x		x	50
	PARING KNIVES					x		x	50
	SERVING SPOONS					x		x	100
	SLOTTED SPOONS					x		x	40
	PERFORATED SPOONS					x		x	40
	WHISKS					x		x	20
	MIXING BOWLS					x		x	20
	PLACE SETTINGS			Cases of 12 (fork,knife,spoon)		x		x	300
	ENTRÉE PLATES			24 plates/case		x		x	300
	PASTA BOWLS			24 bowls per case		x		x	300
	SALAD / DESSERT PLATES			12 plates/case		x		x	300
	SHELVING FOR WALK-IN COOLER						x	x	8
	HAND SOAP/SANITIZER					x		x	100
	THERMOMETERS					x		x	30
CLASSROOM									
	OVERHEAD PROJECTOR						x	x	1
	SCREEN						x	x	1
WELLNESS / FITNESS									
	SOLO STEP GAIT TRAINER			POWER LIFT	x			x	
	PORTABLE LIFT			FULL BODY CARE LIFT	x			x	
	DUMBBELL SET			CAP Barbell Rubber Coated Dumbbell Set with Storage Rack	x			x	2
	EXERCISE STEP			AmazonBasics Aerobic Exercise Workout Step Platform with Adjustable Risers - 42.5 x 16 x 4 Inches, Black	x			x	1

	MULTIPURPOSE RESISTIVE MACHINE			INFINITY SERIES FUNCTIONAL TRAINER	x			x	2
	HI-LO MAT TABLE			PLATFORM WITH UPHOLSTERED TOP	x			x	
	HI-LO STAND-IN TABLE			BARIATRIC ELECTRIC STAND IN TABLE	x			x	
	HI-LO TREATMENT TABLE			ADJUSTABLE EXAM TABLE	x			x	
	HYDROCOLLATOR 12 HOTPACS			12 HOT PACS	x			x	
	HYDROCOLLATOR 24 HOTPACS			24 HOT PACS	x			x	
	MIRROR - WHEELED			ECONO MIRROR	x			x	
	NUSTEP			T5/T5XR CROSS TRAINER	x			x	1
	PARALLEL BARS			PARLLEL BARS	x			x	
	RING TREE			HORIZONTAL RING TREE	x			x	
	SCIFIT STEPPER			STEP ONE STEPPER	x			x	
	SCIFIT UE_LE BIKE			RECUMBENT BIKE	x			x	2
	STACKING CONES			STACKING CONES	x			x	
	STAND-AID LIFT			ELEC SIT TO STAND LIFT	x			x	
	TRAINING STAIRS			CONVERTIBLE 4/8 STAIRS	x			x	
	TREATMENT TABLE			HARDWOOD MAT TABLE	x			x	
	ULTRASOUND E-STIM COMBO MACHINE			COMBO CARE ESTIN ULTRASOUND	x			x	
	UPPER BODY ERGOMETER				x			x	
	WALKER - PLATFORM WALKER			PLATFORM WALKER	x			x	
	WALKER - FRONT WHEEL			CLEVER LITE LS ROLLATOR WALKER WITH SEAT AND BRAKES	x			x	
	WALKER - 4 WHEEL			FOUR WHEEL WALKER ROLLATOR WITH REMOVEABLE BACK	x			x	
	TREADMILL				x			x	4
	AIREX BALANCE PAD				x			x	
	EXERCISE BALLS			Exercise Ball	x		x		2
	GAIT BELTS			COTTON GAIT BELTS	x		x		
	FOLDABLE WALKER			FOLDING WALKER	x		x		
	PEGBOARD			9 HOLE	x			x	
	PUTTY			BODY MED HAND THERAPY PUTTY	x		x		
	RECIPROCAL PULLEYS			ECONOMY SHOULDER PULLEY	x		x		1
	DIRTY LINEN HAMPER					x		x	1
ADMIN					UA	DB	UA	DB	
APPLIANCES/EQUIPMENT		TAG	IMAGE	DESCRIPTION	SUPPLIED BY:		INSTALLED BY:		QTY
CARTS									
	MAIL ROOM SORTING TABLE					x		x	2
	40-COMPARTMENT POCKET SORTER W/ RISER					x		x	1
	MAIL CARTS, WIRE BASKET				x			x	2
MAINTENANCE & HOUSEKEEPING					UA	DB	UA	DB	
APPLIANCES/EQUIPMENT		TAG	IMAGE	DESCRIPTION	SUPPLIED BY:		INSTALLED BY:		QTY
	HEATED FOOD TRANSPORT					x		x	6
	HOUSEKEEPING CARTS					x		x	10
	TRASH TRANSPORT BIN					x		x	6
	TRASH CANS					x		x	40

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Long Term Care

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
LOWER LEVEL									
XXX	Corridors	5	Bench			Artwork	45		
XXX	Offices	2	L-Shape Desk			Artwork	2		
	Dietary Director	2	Task Chair						
	HK Office	2	Bookcase						
		2	File Ped - BBF						
		2	Stacking Chair						
		2	Keyboard Tray						
		2	Pencil Tray @ Built-ins						
LOWER LEVEL TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
LEVEL 1									
XXX	Lobby Reception	4	Wing Back Chair	Pillows	4	Artwork	1	Accessories	10
		3	Side Table	Drapery	7			Faux Plants - Med	1
		1	Coffee Table					Faux Plants - Lg	1
		1	Sofa					Table Lamp	3
		1	Task Chair						
		1	Sofa						
		1	Credenza						
		1	Hotel Cart						
XXX	Activity Club Room	12	Arm Chair	Pillows	2	Artwork	2	Accessories	10

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		3	Table - 42" Sq					Faux Plants - Med	1
XXX	Business Center & Library	4	Wing Back Chair	Pillows	4			Accessories	20
		2	Side Table	Drapery	8			Faux Plants - Med	1
		1	Ottoman					Faux Plants - Lg	1
		1	Bookshelf						
XXX	Dining and Café	22	Dining Chair	Pillows	12	Artwork	6	Accessories	20
		5	High Back Dining Chair	Drapery	10	Artwork	1	Faux Table Arrangement	25
		6	Table - 36" Sq						
		13	Table - 42" Sq						
		0	Table - 96" Rect						
		4	Lounge Chair						
		2	Coffee Table						
		1	Credenza						
XXX	Dining Terrace	4	Lounge Chair						
		2	Side Table						
		8	Table - 42" Rnd						
		32	Dining Chair						
		1	Coffee Table						
		8	Umbrella w/ Weighted Stand						
XXX	Classroom	25	Stacking / Nesting Chair	Drapery (Blackout)	4	Artwork	4		
		6	Flip Top Table						
		1	Tackboard / Markerboard						

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XXX	Theater	12	Tablet Lounge Chair	Drapery (Acoustic)	2	Artwork	10	Accessories	10
		1	Credenza (with blackout)						
XXX	Barber / Beauty	3	Lounge Chair	Drapery	2	Artwork	15	Accessories	10
	*pedi sink & styling stations in	1	Side Table	Valance	1				
	construction budget	2	Display Shelves						
		2	All Purpose Chair						
		2	Task Stool						
		1	Guest Chair						
		1	Mani Table						
XXX	Chapel	24	Stacking Arm Chair	Drapery (Acoustic)	2	Artwork	10		
		1	Lectern						
		1	Water Feature (per Troy)						
		1	Kneeler (to be bolted)						
XXX	Office - Education	2	Straight Desk			Artwork	3	Faux Plants - Small	2
		2	Task Chair						
		2	Bookcase						
		4	Guest Chair						
		2	File Ped - BBF						
		1	Table - Round 42"						
		2	Keyboard Tray						
		2	Pencil Tray @ Built-ins						
XXX	Office - Assistant	1	L-shaped Desk			Artwork	2	Faux Plants - Small	1
		1	Task Chair						
		1	Bookcase						

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		2	Guest Chair						
		1	File Ped - BBF						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Office - Director	1	L-shaped Desk	Valance	1	Artwork	2	Faux Plants - Small	1
		1	Task Chair						
		1	Bookcase						
		2	Guest Chair						
		1	Side Table						
		1	File Ped - BBF						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Office - SYOH Nurse	1	L-shaped Desk			Artwork	2	Faux Plants - Small	1
		1	Task Chair						
		1	Table - Round 36"						
		2	Guest Chair						
		1	File Ped - BBF						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Office - Staff Coordinator	1	Straight Desk			Artwork	2	Faux Plants - Small	1
		1	Task Chair						
		1	File Ped - BBF						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Office - Work Room	1	Straight Desk	Valance	1	Artwork	2	Faux Plants - Small	1

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		1	Task Chair						
		1	Side Table						
		2	Lounge Chair						
		1	File Ped - BBF						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Open Office	6	Straight Desk	Valance	1	Artwork	6	Faux Plants - Small	6
	IC/QA	6	Task Chair						
	MDS/EHR	6	File Ped - BBF						
	Infection Control	6	Lateral File						
		6	Keyboard Tray						
		6	Pencil Tray @ Built-ins						
XXX	Corridors	2	Lounge Chair	Valance	4	Artwork	35	Accessories	15
		2	Credenza	Drapery (@ elevator)	2	Artwork (sculptural panel / sf)	500		
				Drapery (@ wellness)	2				
XXX	Public Restrooms	3	Display Shelves			Artwork	7	Accessories	12
								Faux Plants - Small	3
XXX	Courtyards	8	Lounge Chair						
		4	Side Tables						
		4	Table - 42" Rnd						
		16	Dining Chair						
		4	Umbrella w/ Weighted Stand						
		4	Bench						

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HOUSEHOLD A									
XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						

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XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
								Faux Table Arrangement	
		6	High Back Dining Chair	Drapery	4	Artwork	1		6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						

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XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1
		1	Loveseat						
		1	36" Round Table						
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD B

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						

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		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1

FFE Budget - Quincy
Long Term Care

XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Alcove	4	Lounge Chair			Artwork	3	Accessories	3
		2	Side Table					Table Lamp	2
XXX	Laundry	2	Arm Chair			Artwork	4		

HOUSEHOLD C

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						

FFE Budget - Quincy
Long Term Care

XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						

FFE Budget - Quincy
Long Term Care

		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Laundry	2	Arm Chair			Artwork	4		
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD D

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				

FFE Budget - Quincy
Long Term Care

		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedsread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2

FFE Budget - Quincy
Long Term Care

		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						

FFE Budget - Quincy
Long Term Care

XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1
		1	Loveseat						
		1	36" Round Table						
LEVEL 1 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
LEVEL 2									
XXX	Multipurpose Activity Room	24	Arm Chair	Drapery (Blackout)	4	Artwork	6	Faux Plants - Lg	2
		6	Table - 42" Sq						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Drapery	2	Artwork	3	Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	3-Season Porch	4	Lounge Chair	Wood Blinds	7			Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	Multipurpose Activity Room	24	Arm Chair	Drapery (Blackout)	4	Artwork	6	Faux Plants - Lg	2
		6	Table - 42" Sq						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Drapery	2	Artwork	3	Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						

FFE Budget - Quincy
Long Term Care

		1	Credenza						
XXX	3-Season Porch	4	Lounge Chair	Wood Blinds	7			Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	Open Office	2	L-Shape Desk	Valance	1	Artwork	6	Faux Plants - Small	2
		2	Task Chair						
		2	File Ped - BBF						
		4	Guest Chair						
		4	Lateral File						
		2	Keyboard Tray						
		2	Pencil Tray @ Built-ins						
XXX	Private Office	1	L-Shape Desk	Valance	1	Artwork	3	Faux Plants - Small	1
		1	Task Chair						
		1	File Ped - BBF						
		2	Guest Chair						
		1	Lateral File						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Corridors					Artwork	20		
XXX	Terraces	8	Lounge Chair						
		4	Cocktail Table						
		10	Table - 42" Rnd						
		40	Dining Chair						

FFE Budget - Quincy
Long Term Care

		10	Umbrella w/ Weighted Stand						

HOUSEHOLD A

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2

FFE Budget - Quincy
Long Term Care

		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						

FFE Budget - Quincy
Long Term Care

XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1
		1	Loveseat						
		1	36" Round Table						
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD B

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						

FFE Budget - Quincy
Long Term Care

		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1

FFE Budget - Quincy
Long Term Care

XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Alcove	4	Lounge Chair			Artwork	3	Accessories	3
		2	Side Table					Table Lamp	2
XXX	Laundry	2	Arm Chair			Artwork	4		

HOUSEHOLD C

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						

FFE Budget - Quincy
Long Term Care

XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						

FFE Budget - Quincy
Long Term Care

XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Laundry	2	Arm Chair			Artwork	4		
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD D

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						

FFE Budget - Quincy
Long Term Care

		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedsread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						

FFE Budget - Quincy
Long Term Care

		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1

FFE Budget - Quincy
Long Term Care

		1	Loveseat						
		1	36" Round Table						
LEVEL 2 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
LEVEL 3									
XXX	Multipurpose Activity Room	24	Arm Chair	Drapery (Blackout)	4	Artwork	6	Faux Plants - Lg	2
		6	Table - 42" Sq						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Drapery	2	Artwork	3	Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	3-Season Porch	4	Lounge Chair	Wood Blinds	7			Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	Multipurpose Activity Room	24	Arm Chair	Drapery (Blackout)	4	Artwork	6	Faux Plants - Lg	2
		6	Table - 42" Sq						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Drapery	2	Artwork	3	Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						

FFE Budget - Quincy
Long Term Care

XXX	3-Season Porch	4	Lounge Chair	Wood Blinds	7			Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	Open Office	2	L-Shape Desk	Valance	1	Artwork	6	Faux Plants - Small	2
		2	Task Chair						
		2	File Ped - BBF						
		4	Guest Chair						
		4	Lateral File						
		2	Keyboard Tray						
		2	Pencil Tray @ Built-ins						
XXX	Private Office	1	L-Shape Desk	Valance	1	Artwork	3	Faux Plants - Small	1
		1	Task Chair						
		1	File Ped - BBF						
		2	Guest Chair						
		1	Lateral File						
		1	Keyboard Tray						
		1	Pencil Tray @ Built-ins						
XXX	Corridors					Artwork	20		

HOUSEHOLD A

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						

FFE Budget - Quincy
Long Term Care

		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedsread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						

FFE Budget - Quincy
Long Term Care

		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1

FFE Budget - Quincy
Long Term Care

		1	Loveseat						
		1	36" Round Table						
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD B

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5

FFE Budget - Quincy
Long Term Care

		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6

FFE Budget - Quincy
Long Term Care

		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Alcove	4	Lounge Chair			Artwork	3	Accessories	3
		2	Side Table					Table Lamp	2
XXX	Laundry	2	Arm Chair			Artwork	4		

HOUSEHOLD C

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedsread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedsread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						

FFE Budget - Quincy
Long Term Care

		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1

FFE Budget - Quincy
Long Term Care

XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Laundry	2	Arm Chair			Artwork	4		
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						
HOUSEHOLD D									
XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		

FFE Budget - Quincy
Long Term Care

	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						

FFE Budget - Quincy
Long Term Care

XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chairs	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1
		1	Loveseat						
		1	36" Round Table						
LEVEL 3 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	

LEVEL 4

FFE Budget - Quincy
Long Term Care

XXX	Multipurpose Activity Room	24	Arm Chair	Drapery (Blackout)	4	Artwork	6	Faux Plants - Lg	2
		6	Table - 42" Sq						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Drapery	2	Artwork	3	Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	3-Season Porch	4	Lounge Chair	Wood Blinds	7			Accessories	5
		2	Side Table					Table Lamp	2
		1	Ottoman						
		1	Credenza						
XXX	Open Office	2	L-Shape Desk	Valance	1	Artwork	6	Faux Plants - Small	2
		2	Task Chair						
		2	File Ped - BBF						
		4	Guest Chair						
		4	Lateral File						
		2	Keyboard Tray						
		2	Pencil Tray @ Built-ins						
XXX	Terraces	4	Lounge Chair						
		2	Cocktail Table						
		2	Table - 42" Rnd						
		8	Dining Chair						
		2	Umbrella w/ Weighted Stand						

HOUSEHOLD A

FFE Budget - Quincy
Long Term Care

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedsread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedsread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15

FFE Budget - Quincy
Long Term Care

		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5

FFE Budget - Quincy
Long Term Care

		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1
		1	Loveseat						
		1	36" Round Table						
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD B

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						

FFE Budget - Quincy
Long Term Care

		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1

FFE Budget - Quincy
Long Term Care

XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Alcove	4	Lounge Chair			Artwork	3	Accessories	3
		2	Side Table					Table Lamp	2
XXX	Laundry	2	Arm Chair			Artwork	4		

HOUSEHOLD C

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						
		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		

FFE Budget - Quincy
Long Term Care

	1 unit	1	Footwall Furniture - Dresser	Bedspread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						
		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						

FFE Budget - Quincy
Long Term Care

XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Laundry	2	Arm Chair			Artwork	4		
XXX	Salon	1	Lounge Chair	Valance	1	Artwork	20	Accessories	5
	*pedi sink & styling stations in	1	All Purpose Chair						
	construction budget	1	Task Stool						

HOUSEHOLD D

XXX	Resident Unit	14	Footwall Furniture - Desk	Valance	28	Artwork	42		
	13 units	14	Footwall Furniture - Dresser	Bedspread	14				
	1 bariatric unit	14	Footwall Furniture - Shelves	Shower Curtain	14				
		14	Desk Chair						
		14	Recliner						

FFE Budget - Quincy
Long Term Care

		14	Bed (headbd, footbd, frame, mattress)						
		14	Overbed Table						
		14	Bedside Table						
XXX	Resident Unit - Semi Private	1	Footwall Furniture - Desk	Valance	1	Artwork	3		
	1 unit	1	Footwall Furniture - Dresser	Bedsread	1				
		1	Footwall Furniture - Shelves	Shower Curtain	1				
		1	Desk Chair						
		1	Recliner						
		1	Bed (headbd, footbd, frame, mattress)						
		1	Overbed Table						
		1	Bedside Table						
XXX	Corridor	1	Credenza	Valance	1	Artwork	16	Accessories	5
		1	Task Chair (Nurse Station)					Faux Plants - Small	1
XXX	Den	3	Lounge Chair	Valance	2	Artwork	3	Accessories	15
		2	Side Table	Drapery	4			Faux Plants - Small	1
		1	Loveseat					Table Lamp	2
		1	Credenza						
XXX	Living Room	2	Lounge Chair	Drapery	2	Artwork	5	Accessories	15
		2	Side Table					Faux Plants - Small	2
		1	Sofa					Faux Plants - Med	1
		1	Credenza					Table Lamp	2
		8	Arm Chair						
		2	Table - 42" Sq						

FFE Budget - Quincy
Long Term Care

		1	Ottoman						
XXX	Living Room Terrace	2	Lounge Chair						
		1	Side Table						
		1	Table - 42" Rnd						
		4	Dining Chair						
XXX	Spa	2	Arm Chair	Valance	1	Artwork	5	Accessories	5
				Cubicle Curtain	1			Faux Plants - Small	1
XXX	Dining	6	Dining Chair (assuming 50%)	Valance	2	Artwork	5	Accessories	20
		6	High Back Dining Chair	Drapery	4	Artwork	1	Faux Table Arrangement	6
		3	Table - 42" Sq						
		1	Table - 96" Rect						
		2	Lounge Chair						
		1	Ottoman						
		1	Credenza						
XXX	Restorative	4	Lounge Chair	Valance	2	Artwork	3	Accessories	5
		2	Side Table	Drapery	4			Table Lamp	2
		1	Ottoman						
XXX	Nurse Lounge	2	Arm Chair	Valance	1	Artwork	4	Accessories	5
		1	Side Table	Drapery	2			Table Lamp	1

FFE Budget - Quincy
Long Term Care

		1	Loveseat						
		1	36" Round Table						
LEVEL 4 TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
BUILDING TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	

DVA TO POPULATE AND EDIT									
LTC						UA	DB	UA	DB
APPLIANCES/EQUIPMENT		TAG	IMAGE	DESCRIPTION		SUPPLIED BY:		INSTALLED BY:	QTY
CARTS & CLINICAL									
	SUPPLY CART						X		X
NURSING									
	PHARMACY SHELVING						X		X
	RACKS FOR SUPPLY STORAGE						X		X
	REFRIGERATOR / FREEZER			P. G213			X		X
	LOCKERS (2-STACK, 3 WIDE)						X		X
	TRAPEZE			P. A109		X			X
	TRAPEZE FLOOR STAND					X			X
	HOYER-TYPE PATIENT LIFT					X			X
	HOYER PADDED SLING					X			X
	CEILING LIFT SLINGS						X		X
	CEILING LIFT HEADS						X		X
	BARIATRIC TRAPEZE AND FLOOR STAND					X			X
	HOYER-TYPE BARIATRIC LIFT					X			X
	HOYER POWER BARIATRIC LIFT SCALE					X			X
	BARIATRIC TRAPEZE					X			X
	BARIATRIC CEILING LIFT HEAD						X		X
	REFRIGERATOR (NO FREEZER)						X		X
	TOWEL / BLANKET WARMER			P. G393		X			X
	WHEELCHAIR SCALE					X			X
	AED					X			X
	BP MACHINES					X			X
	PULSE OX MACHINES					X			X
	PATIENT LIFTS SIT-TO-STAND					X			X
	TOTAL LIFT WITH SCALE AND SLING					X			X
	BLADDER SCANNER					X			X
	VEIN FINDER WITH STAND					X			X
	TUBE FEEDING PUMPS					X			X
	IV PUMPS					X			X
	O2 FLOW METERS					X			X
	MEDICAL RECORD CHART RACKS					X			X
	MED CARTS					X			X
	TREATMENT CARTS					X			X
	INFECTION CONTROL / ISOLATION CARTS					X			X
	ISOLATION BOXES					X			X
	OXYGEN BOTTLE STORAGE RACKS					X			X
	CPR DUMMIES - ADULT					X			X
	CPR DUMMIES - CHILD					X			X
	EXTRICATION DUMMY - LARGE					X			X
	SHOWER CHAIR					X			X
	RECLINING SHOWER CHAIR					X			X

	BARIATRIC SHOWER CHAIR				X		X	0
	BARIATRIC RECLINING SHOWER CHAIR				X		X	14
	ORAL THERMOMETERS				X	X		14
	RECTAL THERMOMETERS				X	X		0
	SUCTION PUMPS				X	X		8
	CPR BOARD				X	X		8
	MEDICAL RECORD CHARTS				X	X		210
	CLIP BOARDS				X	X		56
	CRASH CART							4
	AIR FLOW METER							100
	SUCTION WALL CONNECTORS							14
	TEMPORAL THERMOMETERS							14
DINING								1
	FOOD SELECTION SIGNAGE					X	X	1
	SHELVING					X	X	8
	SHELVING					X	X	10
	TRANSPORT CARTS FOR HOT FOOD					X	X	8
	TRANSPORT CARTS FOR COLD FOOD					X	X	4
	ICE MAKER					X	X	1
	SAUTE PANS				X	X		12
	STOCK POTS				X	X		10
	SAUCEPANS				X	X		10
	BAKING SHEETS				X	X		40
	BAKING PANS				X	X		40
	TONGS				X	X		120
	SPATULAS				X	X		30
	LADLES				X	X		20
	CHEF'S KNIVES				X	X		50
	PARING KNIVES				X	X		50
	SERVING SPOONS				X	X		100
	SLOTTED SPOONS				X	X		40
	PERFORATED SPOONS				X	X		40
	WHISKS				X	X		20
	MIXING BOWLS				X	X		20
	PLACE SETTINGS				X	X		300
	ENTRÉE PLATES				X	X		300
	PASTA BOWLS				X	X		300
	SALAD / DESSERT PLATES				X	X		300
	SHELVING FOR WALK-IN COOLER					X	X	8
	HAND SOAP/SANITIZER				X	X		100
	THERMOMETERS				X	X		30
CLASSROOM	OVERHEAD PROJECTOR					X	X	1
	SCREEN					X	X	1

WELLNESS / FITNESS									
	SOLO STEP GAIT TRAINER			POWER LIFT	x			x	
	PORTABLE LIFT			FULL BODY CARE LIFT	x			x	
	AIREX BALANCE PAD				x				
	DUMBBELL SET			CAP Barbell Rubber Coated Dumbbell Set with Storage Rack	x			x	2
	EXERCISE BALLS			Exercise Ball	x			x	2
	EXERCISE STEP			AmazonBasics Aerobic Exercise Workout Step Platform with Adjustable Risers - 42.5 x 16 x 4 Inches, Black	x			x	1
	MULTIPURPOSE RESISTIVE MACHINE			INFINITY SERIES FUNCTIONAL TRAINER	x			x	2
	HI-LO MAT TABLE			PLATFORM WITH UPHOLSTERED TOP	x			x	
	HI-LO STAND-IN TABLE			BARIATRIC ELECTRIC STAND IN TABLE	x			x	
	HI-LO TREATMENT TABLE			ADJUSTABLE EXAM TABLE	x			x	
	HYDROCOLLATOR 12 HOTPACS			12 HOT PACS	x			x	
	HYDROCOLLATOR 24 HOTPACS			24 HOT PACS	x			x	
	MIRROR - WHEELED			ECONO MIRROR	x			x	
	NUSTEP			T5/T5XR CROSS TRAINER	x			x	1
	PARALLEL BARS			PARLLEL BARS	x			x	
	RECIPROCAL PULLEYS			ECONOMY SHOULDER PULLEY	x			x	1
	RING TREE			HORIZONTAL RING TREE	x			x	
	SCIFIT STEPPER			STEP ONE STEPPER	x			x	
	SCIFIT UE_LE BIKE			RECUMBENT BIKE	x			x	2
	STAND-AID LIFT			ELEC SIT TO STAND LIFT	x			x	
	TRAINING STAIRS			CONVERTIBLE 4/8 STAIRS	x			x	
	TREATMENT TABLE			HARDWOOD MAT TABLE	x			x	
	ULTRASOUND E-STIM COMBO MACHINE			COMBO CARE ESTIN ULTRASOUND	x			x	
	UPPER BODY ERGOMETER							x	
	WALKER - PLATFORM WALKER			PLATFORM WALKER	x			x	
	WALKER - FRONT WHEEL			CLEVER LITE LS ROLLATOR WALKER WITH SEAT AND BRAKES	x			x	
	WALKER - 4 WHEEL			FOUR WHEEL WALKER ROLLATOR WITH REMOVEABLE BACK	x			x	
	TREADMILL				x			x	4
	PT BARS				x			x	1
	PT STAIRS				x			x	1
	PT BIKE				x			x	1
	AIREX BALANCE PAD								
	EXERCISE BALLS			Exercise Ball	x		x		2
	GAIT BELTS			COTTON GAIT BELTS	x		x		
	FOLDABLE WALKER			FOLDING WALKER	x		x		
	PEGBOARD			9 HOLE	x		x		
	PUTTY			BODY MED HAND THERAPY PUTTY	x		x		
	STACKING CONES			STACKING CONES	x		x		
	DIRTY LINEN HAMPER								1
THERAPY ROOM									

	SOLO STEP GAIT TRAINER			POWER LIFT	x			x	1
	PORTABLE LIFT			FULL BODY CARE LIFT	x			x	1
	DUMBBELL SET			CAP Barbell Rubber Coated Dumbbell Set with Storage Rack	x			x	1
	EXERCISE STEP			AmazonBasics Aerobic Exercise Workout Step Platform with Adjustable Risers - 42.5 x 16 x 4 Inches, Black	x			x	1
	MULTIPURPOSE RESISTIVE MACHINE			INFINITY SERIES FUNCTIONAL TRAINER	x			x	1
	HI-LO MAT TABLE			PLATFORM WITH UPHOLSTERED TOP	x			x	1
	HI-LO STAND-IN TABLE			BARIATRIC ELECTRIC STAND IN TABLE	x			x	1
	HI-LO TREATMENT TABLE			ADJUSTABLE EXAM TABLE	x			x	1
	HYDROCOLLATOR 12 HOTPACS			12 HOT PACS	x			x	1
	HYDROCOLLATOR 24 HOTPACS			24 HOT PACS	x			x	1
	MIRROR - WHEELED			ECONO MIRROR	x			x	1
	FOLDABLE WALKER			FOLDING WALKER	x			x	1
	NUSTEP			T5/T5XR CROSS TRAINER	x			x	1
	PARALLEL BARS			PARLLEL BARS	x			x	1
	RECIPROCAL PULLEYS			ECONOMY SHOULDER PULLEY	x			x	1
	RING TREE			HORIZONTAL RING TREE	x			x	1
	SCIFIT STEPPER			STEP ONE STEPPER	x			x	1
	SCIFIT UE_ LE BIKE			RECUMBENT BIKE	x			x	1
	STAND-AID LIFT			ELEC SIT TO STAND LIFT	x			x	1
	TRAINING STAIRS			CONVERTIBLE 4/8 STAIRS	x			x	1
	TREATMENT TABLE			HARDWOOD MAT TABLE	x			x	1
	ULTRASOUND E-STIM COMBO MACHINE			COMBO CARE ESTIN ULTRASOUND	x			x	1
	UPPER BODY ERGOMETER				x			x	1
	WALKER - PLATFORM WALKER			PLATFORM WALKER	x			x	1
	WALKER - FRONT WHEEL			CLEVER LITE LS ROLLATOR WALKER WITH SEAT AND BRAKES	x			x	1
	WALKER - 4 WHEEL			FOUR WHEEL WALKER ROLLATOR WITH REMOVEABLE BACK	x			x	1
	AIREX BALANCE PAD								1
	EXERCISE BALLS			Exercise Ball	x		x		4
	GAIT BELTS			COTTON GAIT BELTS	x		x		4
	FOLDABLE WALKER			FOLDING WALKER	x		x		1
	PEGBOARD			9 HOLE	x		x		1
	PUTTY			BODY MED HAND THERAPY PUTTY	x		x		1
	STACKING CONES			STACKING CONES	x		x		1
	DIRTY LINEN HAMPER								1
EXAM ROOM									
	PATIENT EXAM TABLE				x			x	1
	DIRTY LINEN HAMPER								1
LAUNDRY									
	SOILED LINEN CARTS				x			x	10
	CLEAN LINEN CARTS				x			x	16
	CLEAN LINEN CARTS - COVERS				x			x	16

	BULK TRANSPORT TRUCKS					x		x	16	
	WIRE LAUNDRY CART W/ RACK					x		x	32	
	LAUNDRY CART COVER AND FRAME					x		x	32	
	THERMAL PRINTER					x		x	1	
	THERMAL PERFORATED LABEL TAPE					x	x		4	
	HEAT SEAL MACHINE					x		x	1	
	HANGING CLOTHING RACK					x		x	8	
	WHEELED LAUNDRY BASKETS					x		x	24	
	LAUNDRY BINS					x		x	12	
	WIRE LINEN RACKS					x		x	14	
	BASKET LINERS								32	
ADMIN						UA	DB	UA	DB	
APPLIANCES/EQUIPMENT		TAG	IMAGE	DESCRIPTION		SUPPLIED BY:		INSTALLED BY:		QTY
CARTS										
	MAIL ROOM SORTING TABLE						x		x	2
	40-COMPARTMENT POCKET SORTER W/ RISER						x		x	1
	MAIL CARTS, WIRE BASKET					x			x	2
	40-COMPARTMENT POCKET SORTER W/ RISER						x		x	1
	MAIL CARTS, WIRE BASKET					x			x	2
MAINTENANCE & HOUSEKEEPING						UA	DB	UA	DB	
APPLIANCES/EQUIPMENT		TAG	IMAGE	DESCRIPTION		SUPPLIED BY:		INSTALLED BY:		QTY
	HEATED FOOD TRANSPORT						x		x	6
	HOUSEKEEPING CARTS						x		x	10
	TRASH CANS						x		x	40
	NEEDLE BOXES						x		x	20
	GLOVE BOXES					x			x	20
	HAND SOAP DISPENSER						x		x	20
	HAND SANITIZER DISPENSER						x		x	20
	PAPER TOWEL BOXES						x		x	20
	TRASH TRANSPORT BIN						x		x	6
	STORAGE CAGES - DOUBLE 36X36X90						x		x	100
	STORAGE CAGE LOCKS OR SEALS					x			x	100
	PALLET RACKING - WIRE DECKING						x		x	10
	PALLET RACKING - ADDITIONAL BEAMS						x		x	20
	SHELVING						x		x	4
	VACUUM CLEANERS					x				4
	WET / DRY VACS					x		x		1
	STEAM CARPET EXTRACTOR - LG					x		x		1
	STEAM EXTRACTOR - SM					x		x		2
	BUFFER / POLISHER - ROUND HEAD					x		x		1
	FLOOR SCRUBBER - LG					x		x		4
	POWER WASHER					x		x		1

FFE Budget - Quincy
Nielson

ROOMS		FURNITURE		SOFT TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	
Rm No.	Room Name	Qty	Description	Description	Qty	Description	Qty	Description	Qty
XXX	Classroom	16	Stacking / Nesting Chair	Valance	4	Artwork	4	Faux Plants - Lg	2
		4	Flip Top Table						
		1	Tackboard / Markerboard						
XXX	Employee Breakroom	36	Stacking Chairs	Valance	10	Artwork	5	Accessories	10
		7	Table - 42" Sq	Drapery	2	Mural	1	Faux Plants - Med	2
		4	Table - 36" Sq					Table Lamp	4
		10	Lounge Chair						
		2	Side Table						
		1	Ottoman						
		3	Table - 36" Rnd						
BUILDING TOTALS		FURNITURE		WINDOW TREATMENTS		ARTWORK		ACCESSORIES/PLANTS	

DVA TO POPULATE AND EDIT									
NIELSON		TAG	IMAGE	DESCRIPTION	UA	DB	UA	DB	
APPLIANCES/EQUIPMENT					SUPPLIED BY:		INSTALLED BY:		QTY
CARTS & CLINICAL									
	SUPPLY CART				X			X	1
DINING									
	FOOD SELECTION SIGNAGE					X		X	1
	SHELVING					X		X	8
	SHELVING					X		X	10
	TRANSPORT CARTS FOR HOT FOOD					X		X	8
	TRANSPORT CARTS FOR COLD FOOD					X		X	4
	ICE MAKER					X		X	1
	SAUTE PANS				X		X		12
	STOCK POTS				X		X		10
	SAUCEPANS				X		X		10
	BAKING SHEETS				X		X		40
	BAKING PANS				X		X		40
	TONGS				X		X		120
	SPATULAS				X		X		30
	LADLES				X		X		20
	CHEF'S KNIVES				X		X		50
	PARING KNIVES				X		X		50
	SERVING SPOONS				X		X		100
	SLOTTED SPOONS				X		X		40
	PERFORATED SPOONS				X		X		40
	WHISKS				X		X		20
	MIXING BOWLS				X		X		20
	PLACE SETTINGS				X		X		300
	ENTRÉE PLATES				X		X		300
	PASTA BOWLS				X		X		300
	SALAD / DESSERT PLATES				X		X		300
	SHELVING FOR WALK-IN COOLER					X		X	8
	HAND SOAP/SANITIZER				X		X		100
	THERMOMETERS				X		X		30
CLASSROOM									
	OVERHEAD PROJECTOR					X		X	
	SCREEN					X		X	
MAINTENANCE & HOUSEKEEPING		TAG	IMAGE	DESCRIPTION	UA	DB	UA	DB	
APPLIANCES/EQUIPMENT					SUPPLIED BY:		INSTALLED BY:		QTY
	HEATED FOOD TRANSPORT					X		X	6
	HOUSEKEEPING CARTS				X			X	10
	TRASH TRANSPORT BIN				X			X	6
	STORAGE CAGES - DOUBLE 36X36X90					X		X	100
	PALLET RACKING - WIRE DECKING					X		X	10
	PALLET RACKING - ADDITIONAL BEAMS					X		X	20
	SHELVING					X		X	4
	VACUUM CLEANERS				X		X		4
	WET / DRY VACS				X		X		1

	STEAM CARPET EXTRACTOR - LG			X		X		1
	STEAM EXTRACTOR - SM			X		X		2
	BUFFER / POLISHER - ROUND HEAD			X		X		1
	FLOOR SCRUBBER - LG			X		X		4
	POWER WASHER			X		X		1
	STORAGE CAGE LOCKS OR SEALS				X		X	100
	RUBBER FLOOR MATS				X		X	12
	WET FLOOR SIGNS				X		X	10
	MOP HANDLES				X		X	10
	FLOOR SQUEEGEES				X		X	10
	HI-DUSTERS				X		X	10
	DUSTBUSTERS				X		X	5
	MANUAL CARPET SWEEPER				X		X	5
	LINEN HOLDING HAMPER - L				X		X	6
IT APPLIANCES/EQUIPMENT	TAG	IMAGE	DESCRIPTION	UA SUPPLIED BY:	DB	UA INSTALLED BY:	DB	QTY
	SHELVING				X		X	8
	MISC. I.E. COMPUTER SERVER RACKS			X		X		8
	WORK CENTER PRINTER / FAX			X		X		2
	COMPUTER / PRINTERS / FAX / TELEPHONE				X		X	1
SUBTOTAL								

DVA TO POPULATE AND EDIT								
LANDSCAPE					UA	DB	UA	DB
APPLIANCES/EQUIPMENT	TAG	IMAGE	DESCRIPTION		SUPPLIED BY:		INSTALLED BY:	
								QTY
Bus, 5-6WC Capacity + 4-6 passengers NonCDL Size					x		x	2
Bus, 8-10WC Capacity + 6-8 passengers CDL Required					x		x	1
Medi-Vans w/WC lift and stretcher capable					x		x	3
Staff Cars/Minivans					x		x	2
Pick-up Truck with plow					x		x	1
Gators					x		x	2
							x	
JOHN DEERE 6X4 GATOR					x		x	2
JOHN DEERE GATOR ACCESSORIES					x		x	
SALT SPREADER					x		x	2
PLOW					x		x	1
SHELVING MAINTENANCE STORAGE			9CY68			x		x
STEEL TOP TABLE			4TW33		x		x	1
MOBILE CABINET AND WORK CENTER					x		x	4
WET / DRY VACUUMS			3VE19		x		x	1
WALK-BEHIND SALT / FERTILIZER SPREADER					x		x	2
SHOVELS / SPADES / HOES					x		x	2
SLEDGEHAMMER					x		x	1
AXE					x		x	1
PICK-AXE					x		x	1
WALK-BEHIND LAWNMOWER			33RW84		x		x	1
CIRCULAR SAW			451G48		x		x	1
SABRE SAW			6YHR9		x		x	1
MITER SAW			10D912		x		x	1
BENCH GRINDER			2FDB5		x		x	1
TABLE SAW			48WE85		x		x	1
SAWZALL			2CDC9		x		x	1
CORDLESS DRILLS - 3/8"			30RW25		x		x	1
CORDED DRILL - 1/2"			83GRF1		x		x	4
ELECTRIC SANDER - PALM					x		x	1
ELECTRIC SANDER - BELT					x		x	1
DRILL PRESS			5PHC4		x		x	1
ROUTER			6YHR8		x		x	1
PORTABLE AIR COMPRESSOR			35DZ67		x		x	1
POWER WASHER			5M2U1		x		x	1
LEAF BLOWER			52KD46		x		x	1
WEED WACKER			53JH20		x		x	1
STEP LADDER			32TM12		x		x	6
PORTABLE SCAFFOLDING			38HT83		x		x	1
SUPPLY CART					x		x	1
HAND TOOLS						x	x	1
TOOL BOX						x	x	3

TOOL CARTS				X	X		3
MULTI-METER			1GAH9	X	X		3
WATER TESTING METER			15F828	X	X		3
EXTENSION CORDS			444C65	X	X		6
THERMOMETERS (WATER TESTING)			4LY14	X	X		3
THERMOMETERS (NO TOUCH INFRARED)			53D225	X	X		3
SUBTOTAL							

1. CODES, REGULATIONS AND GUIDELINES

1.1 BUILDING CODES

- A. International Building Code – 2018
- B. ASCE 7-16 – Minimum Design Loads for Buildings and Other Structures

1.2 DESIGN CODES

- A. ACI 318-14 – Building Code Requirements for Structural Concrete
- B. ACI 530-13 – Building Code Requirements for Masonry Structures
- C. AISC 360-16 – Specification for Structural Steel Buildings
- D. CDB DCM 2009 with 2016 Amendments

2. NARRATIVE SUMMARY

2.1 PROJECT DESCRIPTION

- A. The site improvements consist of the renovation and construction of senior residence facilities. The major building structures consist of the replacement of Markword and Fletcher Halls with the construction of a new domiciliary, as well as a new four-story long-term care facility. New utility tunnels and above ground pedestrian link structures will also be constructed to link buildings.

2.2 NEW DOMICILIARY STRUCTURAL DESCRIPTION

- A. The new three story domiciliary with basement will be cast-in-place concrete with primarily brick masonry facade. The building will have floor-to-floors ranging from 12'-0" to 13'-4". The single-story dining (with clerestory) and amenity portions will utilize steel frame construction with long span joists. The exterior wall system consists of a masonry veneer with CMU for the backup system. Steel shelf angles attached to concrete spandrel beams will be provided to support the masonry at each floor line. The new residential building construction type shall be R-2, Type IIA and will be designed per Risk Category IV.

- 1. Main Wind Force Resisting System:

The overall lateral stability of the three story with basement domiciliary will be provided by concrete shear walls. The diaphragm will consist of a cast-in-place concrete slab. The lateral stability of the dining and amenity portions will be provided by a combination of braced and moment frames.

2. **Typical Elevated Floor Framing System:**
The typical floor will be a two-way slab system of approximately 12" thickness with minimum 16" square columns spaced no further than 30' on center. The typical concrete spandrel beams will be maximum 30" deep where required to support masonry. The roof structure will be sloped a minimum 1/4in per foot for drainage.
3. **Basement:**
The building basement for mechanical space and utility tunnel system connection will be constructed from cast-in-place concrete walls with pilasters for the building columns above. The concrete walls will be supported on grade beams between caisson caps.
4. **Foundation System:**
Caissons will be required for the residential portions of the building with 3' diameter shafts on average, extending at least 35' below grade to stiff sand where they terminate in a bell. Bedrock is first realized at 45'.
The single-story steel frame dining and amenity area is to be supported on shallow foundations bearing at frost depth.
Slab-on-grade will typically be 5" thick concrete reinforced with welded wire fabric (W6xW6-W2.9xW2.9) on crushed stone fill having adequate soil prepared in accordance with the geotechnical recommendations, applicable ASTM standards and IDOT specifications.

2.3 NEW LONG-TERM CARE FACILITY STRUCTURAL DESCRIPTION

- A. The new four-story (total) long term care facility will be a cast-in-place concrete structure with primarily brick masonry facade. The building will have 12'-8" floor-to-floors typical. Based on the residential programming requirements but with flexibility for future renovation, the building will be constructed of cast-in-place concrete columns, walls, and slabs. The exterior wall system consists primarily of a masonry veneer with CMU for the backup system. Steel shelf angles attached to concrete spandrel beams will be provided to support the masonry at each floor line. The new building is considered an "essential facility" per the VA Design Guide, and therefore shall be I-2, Type IA construction type and shall be designed with Risk Category IV requirements.
 1. **Main Wind Force Resisting System:**
The overall lateral stability of the building will be provided by concrete shear walls. The diaphragm will consist of a cast-in-place concrete slab. Building movement joints are provided between the main 'wings' to allow for better lateral performance.
 2. **Typical Elevated Floor Framing System:**
The typical floor will be a two-way slab system of approximately 12" thickness with minimum 16" square columns spaced no further than 30' on center. Typical concrete spandrel beams will be maximum 30" deep where required to support masonry. The roof structure will be sloped a minimum 1/4in per foot for drainage.
 3. **Basement:**
The building basement for mechanical space and utility tunnel system connection will be constructed from cast-in-place concrete walls with pilasters for the building columns above. The concrete walls will be supported on grade beams between caisson caps.

4. Foundation System:
 Caissons will be required for the residential portions of the building with 3' diameter shafts on average, extending at least 35' below grade to stiff sand where they terminate in a bell. Bedrock is first realized at 45'.
 Slab-on-grade will typically be 5" thick concrete reinforced with welded wire fabric (W6xW6-W2.9xW2.9) on crushed stone fill having adequate soil prepared in accordance with the geotechnical recommendations, applicable ASTM standards and IDOT specifications.

2.4 UTILITY TUNNEL DESCRIPTION

- A. New utility tunnels are anticipated to be cast-in-place concrete with minimum slab and wall thickness of 8". The tunnel ceiling will be concrete cast as a second pour with form deck left in place.

2.5 PEDESTRIAN CONNECTION DESCRIPTION

- A. The pedestrian connector between new/existing buildings is anticipated to be a 12' wide open structure will be HSS tube columns with HSS tube beams supporting a 1.5" metal deck roof. The foundation will be a continuous wall type foundation, minimum 24" wide at the bearing elevation, with a slab-on-grade.

3. DETAILS AND MATERIALS

3.1 DESIGN LOADS

Roof

At Domiciliary single-story amenity spaces:

Structure	10	psf
Decking	5	psf
Mech/Elect/Plmg	8	psf
Insulation	10	psf
Ceiling System	2	psf

Total Dead Load 35 psf

Unless noted otherwise:

Slab	100	psf
Mech/Elect/Plmg	8	psf
Insulation	10	psf
Ceiling System	2	psf

Total Dead Load 120 psf

Mechanical Equipment	See Plans
Minimum Roof Live Load	20 psf
Roof Live Load at Mech Equipment Laydown Areas	50 psf

Elevated Floors

Slab	100 psf
Mech/ Elect / Plmg	8 psf
Insulation	5 psf
Ceiling System	2 psf
Flooring	5 psf

Total Dead Load 120 psf

Minimum Design Live Loads:

Private Rooms	40 psf
Corridor 1 st floor	100 psf
Corridors above 1 st floor and Shared Spaces	80 psf
Light Storage	125 psf
Partition Loads	20 psf

Snow Loads:

Ground Snow Load, P_g min	25 psf
Importance Factor, I_s	1.20

Wind Loads:

MWFRS	27psf
Components and Cladding	-36 psf; 27.1 psf

Seismic Loads:

Site Class	D
Importance Factor, I_e	1.50
S_{DS}	0.141
S_{D1}	0.132
SDC	C

3.2 MATERIALS

Concrete: $f'_c = 5,000$ psi (normal weight)
Reinforcing Steel: $f_y = 60,000$ psi
Steel Angle, Channels, Plates: ASTM A36
Steel WF & WT Shapes: ASTM A992
HSS (Sq & Rect): ASTM A500, Grade B
HSS (Round): ASTM A500, Grade C
Pipe: ASTM A53, Grade B

COMMERCIAL LAUNDRY EQUIPMENT NARRATIVE
CENTRAL LAUNDRY

CENTRAL COMMERCIAL LAUNDRY NARRATIVE

The new central laundry will be replacing the current existing laundry that will be commissioned. The existing laundry is located in the Ehle Building that will be demolished as part of this project. The new laundry will not be utilizing steam powered equipment. All equipment will be either gas or electric powered. Dryers will be gas fired are to include fire suppression systems and a centralized lint collector powered by compressed air. The laundry design is currently being based on an approximate 320 skilled nursing residents. Capability to wash and fold larger linens will be accommodated for in the design. The lint collector is to be furnished with a booster fan and variable fan control system, fan to be selected by the mechanical engineer based on ductwork length of run and design.

Equipment specification sheets have been included to represent the basis of design in terms of utility requirements, performance features, and accessories required for this project. The equipment list for each item includes two alternate manufacturers that can be considered as approved alternates.

COMMERCIAL LAUNDRY EQUIPMENT

1. Chemical Storage Shelving by Metro, Eagle, SPG (Four Section Required)
2. Two Bowl Utility Sink by Advance Tabco, Eagle with Faucet by T&S, Fisher
3. Hand Sink by Advance Tabco, Eagle, SPG
4. Eye Wash Station by Advance Tabco, Fisher
5. Soiled Laundry Carts by Meese, Royal, Uline (Twenty Eight Required)
6. Hose Washdown Assembly by T&S, Fisher
7. 20"x84" Custom Fabricated Floor Trough by Custom Fabricator, Steelkor, Eagle
8. Custom Washer Drain Trough with Lint Collector by H-H Company, Highmark Manufacturing
9. Spare number
10. Sixty Pound Washer/Extractor by Milnor, Unimac, Speed Queen (Three Required)
11. Eighty Pound Washer/Extractor by Milnor, Unimac, Speed Queen (Three Required)
12. Dryer Lint Collector by Energetics, Clean Cycle Systems, Air Dynamics
13. One Hundred Gallon Air Compressor by Ingersoll Rand, Quincy
14. Seventy Five Pound Dryer by Milnor, Unimac, Speed Queen (Six Required)
15. Sixteen Pound Top Load Washer by Speed Queen, Unimac, Milnor (Two Required)
16. Double Stacked Eighteen Pound Front Load Dryer by Speed Queen, Unimac, Milnor
17. Stainless Steel Folding Table with Overshelf by Custom Fabricator
18. Ironer by Chicago, Unimac, Girbau
19. Mobile Stainless Steel Table by Custom Fabricator
20. Mobile Clean Linen Storage Shelving by Metro, Eagle, SPG (Five Sections Required)
21. Clean Linen Carts by Meese, Royal, Uline (Twenty Eight Required)
22. Ozone Water Treatment by Owner (Two Required)
23. Lint Collector Booster Fan by Energetics, Clean Cycle Systems, Air Dynamics
24. Lint Collector Fan Control by Energetics, Clean Cycle Systems, Air Dynamics
25. Spare Number
26. Spare Number
27. Spare Number

COMMERCIAL LAUNDRY EQUIPMENT NARRATIVE
CENTRAL LAUNDRY

- 28. Stainless Steel Work Table by Custom Fabricator
- 29. Label Press/Printer System by Owner
- 30. Garment Rack by R&B Wire Products, Garment Racks ETC., Uline (Four Required)
- 31. Gas Fired Steam Tunnel by Leanord, Colmac, Sea Lion
- 32.

BASIS OF DESIGN EQUIPMENT SPECIFICATION SHEET SELECTIONS SHALL BE SHARED
PRIOR TO PHASE 2 TECHNICAL SUBMISSIONS.

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
DOMICILIARY SERVING KITCHEN

DOMICILIARY SERVING KITCHEN FOODSERVICE NARRATIVE

The Domiciliary Serving Kitchen will be receiving prepared cold and hot food from the main serving for support of the residents in the Domiciliary Building. All food will be self-service. All dishes, glasses, and utensils will be washed in the back pantry space with all bulk food pans returning to the main kitchen for washing.

The dining space will include a residential refrigerator freezer to be used for nourishments and residential induction range with oven base for special activity use by the residents. All residential appliances are not included in the commercial food service equipment scope and will be specified by the architect.

The cabinetry will be millwork with a residential appearance. Stainless steel base cabinetry will be used in wet high use areas with open indirect wastes below sinks, dishwashers, hot food wells, ice/water dispensers and any items requiring an indirect waste connection. These stainless-steel base cabinets will be covered with millwork faces to create a residential kitchen appearance.

All equipment unless hard plumbed or hard wired is to be mounted on casters. Gas fired equipment is to include a gas hose disconnect.

Any coffee, juice, iced tea, and other beverage equipment required is excluded from the commercial kitchen equipment list and will be considered by owner or by beverage vendor. Exact requirements will be coordinated with owner and the food service consultant to ensure proper space and utility requirements are being accounted for. The food service equipment contractor will have no related scope for these items.

Equipment specification sheets have been included to represent the basis of design in terms of utility requirements, performance features, and accessories required for this project. The equipment list for each item includes alternate manufacturers that can be considered as approved alternates.

PRELIMINARY DOMICILIARY SERVING KITCHEN EQUIPMENT

1. Hand Sink with Faucet by Advance Tabco, Eagle, or BK Resources
2. Soiled Dishtable with Rack Overshelf and Pre-rinse Sink 30"x84" – One Required by Custom Fabricator
3. Pre-Rinse Spray Assembly – One Required by T&S, Fisher
4. Two Horsepower Disposer with Control – One Required by Insinkerator, Salvajor, Hobart
5. Upright Ventless Dishmachine – One required by Hobart, Champion, Meiko
6. Dish Rack Dolly – Two Required by Cambro, Metro, Eagle
7. Clean Dishtable with Overshelf 30"x96" – One Required by Custom Fabricator
8. Storage Shelving 24"x60" Five Tier Mobile – Two Sections Required by Metro, Eagle, SPG
9. One Section Freezer – One Required by Victory, Continental, Traulsen
10. Two Section Refrigerator – One Required by Victory, Continental, Traulsen
11. Hot Food Transport Cart – One Required by Cambro

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
DOMICILIARY SERVING KITCHEN

12. Cold Food Transport Cart – One Required by Cambro
13. Soda Rack System – One Required by Beverage Vendor
14. Utility Cart – One Required by Eagle, Lakeside, Piper
15. Spare Number
16. Spare Number
17. Spare Number
18. Drop-in Hand Sink with Electronic Faucet – Two Sinks Required by Eagle, Advance, SPG, with Faucets by T&S, Fisher
19. Drop-in Two Bowl Sink with Faucet– Two Sinks Required by Eagle, Advance, SPG with Faucets by T&S, Fisher
20. Undercounter Refrigerator – One Required by Continental, Randell, Delfield
21. Undercounter Heated Cabinet – One Required by AltoShaam, Witco, FWE
22. Microwave Oven – Two Required by Amana, Panasonic, Waring
23. Adjustable Sneeze Guard with Lights and Heatlamps – One Custom Unit Required by English, BSI, Premier
24. Drop-in Heated Plate Dispenser – One Required by Piper, Caddy, Lakeside
25. Front Serving Counter with Tray and Silver Dispenser – One Required by Custom Fabricator with Quartz Top, Stainless Steel Base, and Millwork Applied front as selected by Architect
26. Drop-in Four Well Hot Food Unit – One Required by Randell, Wells, Delfield with drain tempering device by Cool Drain Flow, Inc.
27. Heated Bowl Dispenser – One Required by Piper, Lakeside, Caddy
28. Drop-in Soup Warmer – One Required by Vollrath, Wells, Hatco
29. Plate Dispenser – One Required by Piper, Lakeside, Caddy
30. Refrigerated Cold Pan – One Required by Randell, Delfield, Atlas
31. Spare Number
32. Spare Number
33. Spare Number
34. Drop-in General Use Sink with Faucet – One Sink Required by Eagle, Advance with Faucet by T&S, Fisher
35. General Use Sink Stainless Steel Base Cabinet – One Required by Custom Fabricator
36. Ice Maker – One Required by Hoshizaki, Scotsman, Manitowoc with Water Filter by Everpure, Hoshizaki, Scotsman, Manitowoc
37. Soda and Ice Dispenser – One Required by Beverage Vendor
38. Iced Tea Brewer/Dispenser – One Required by Beverage Vendor
39. Coffee Brewer – One Required by Beverage Vendor
40. Four Slice Toaster – One Required by Toastmaster, Hobart, Hatco

BASIS OF DESIGN EQUIPMENT SPECIFICATION SHEET SELECTIONS SHALL BE SHARED
PRIOR TO PHASE 2 TECHNICAL SUBMISSIONS.

CENTRAL KITCHEN COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE

The new central production kitchen will be approximately 7,450 square feet and will include dry goods storage, refrigerated and freezer storage, preparation, production cooking, bakery prep and bake area, resident meal trayline to service fifer, bulk food preparation/production, food service office (s) and warewashing. This new kitchen will be replacing the existing kitchen currently located in the Nielson Building. All cooking equipment will need to be the manufacturers' "heavy duty" series and will be either gas or electric fired as specified on the food service equipment drawings. Steam will not be utilized to power cooking or warewashing equipment. The central production kitchen will be preparing and cooking all food related to the household serving kitchens and domiciliary serving kitchen that are part of this project. Any food pans used for transportation of food product to the household kitchens will return to the main kitchen for washing and sanitizing. Dishes, glasses, and silverware used in the household and domiciliary kitchens will remain in their respective kitchens and will be washed and sanitized in those locations.

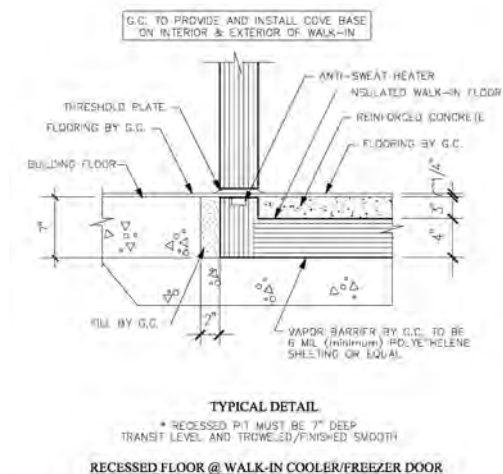
The central receiving and storage that is currently located in the Nielson Building will remain and not be part of the currently proposed project. All product related to food service will continue to be received and stored in the existing Nielson Food Service Storage areas.

All equipment unless hard plumbed or hard wired is to be mounted on casters. Gas fired equipment is to include a gas hose disconnect.

Equipment specification sheets have been included to represent the basis of design in terms of utility requirements, performance features, and accessories required for this project. The equipment list for each item includes alternate manufacturers that can be considered as approved alternates.

Walk-in Cooler/Freezer General Specifications and Requirements

These units are to be recessed into the building slab per the detail below. All units are to be 8'- 6" tall. Below is a list of general requirements and specifications.



COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
CENTRAL KITCHEN

- A - Constructed of modular panels
- B - Construction to be in strict compliance with NSF standard number 7 and in accordance to section 312 of the US Energy Bill H.R.6
- C - Panels are to consist of interior and exterior metal surfaces precision roll formed to exact dimensions with double 90° edges. The finished metal surfaces are to be fitted with a tear drop profile gasket and placed in precision tooled fixtures where they are to be injected with foamed-in place urethane insulation.
- D - Curing of the insulating core is to take place at a controlled temperature to provide permanent adhesion to the metal surfaces, to allow uniform foam expansion and to maximize finished panel strength
- E - Panel edges to have molded urethane tongue and groove profile to accurately align panels during installation and to provide an air tight seal
- F - All light fixtures to be vapor proof globe style fixtures with LED bulbs included
- G - Panels to be 4" thick
- H - Floor panels are to be plywood reinforced constructed as "super floor" and are to be capable of supporting evenly distributed loads of 5,000 lbs. per square foot
- I - Doors are to be flush mount, magnetic infitting type with door opening of 60" wide x 78" high.
- J - Perimeter of the doors and frames shall be built of fiberglass reinforced plastic (FRP) and shall house a door frame heater circuit, flexible bellows type vinyl door gasket with magnetic core, a magnet attracting stainless steel trim strip and flexible vinyl door sweep
- K - Door frames to be provided with a vapor proof light fixture centered above the door with globe pre-wired to a rocker type light switch with pilot light, digital thermometer, variable slide rheostat for heater wire control and a 14 gauge galvanized steel threshold plate
- L - Door hardware to be die cast zinc with brushed satin finish
- M - Doors to be mounted with four (4) heavy-duty Kason # 1277 cam lift hinges per door
- N - Door pull handles to incorporate a keyed cylinder lock, provision for a separate padlock and an inside safety release handle to prevent personnel entrapment
- O - Doors to include a heavy duty Kason # 1097 hydraulic closer device for positive door closing
- P - All doors to include strip curtains
- Q - Cooler doors to have insulation of at least R-25 and freezer doors to have insulation of at least R-32

Walk-in Cooler/Freezer General Specifications and Requirements (Continued)

- R - Finishes are to be as follows:
 - 1 - Unexposed exterior walls to be .032" mill finished stucco embossed aluminum
 - 2 - Exposed exterior walls to be 24 gauge diamond embossed stainless steel
 - 3 - Interior walls to be .032" mill finished stucco embossed aluminum
 - 4 - Interior ceilings to be .032" mill finished stucco embossed aluminum, painted white
 - 5 - Interior floor to be 24 gauge stucco embossed galvalume
 - 6 - Exterior floor to be 26 gauge stucco embossed galvalume
 - 7 - Exterior ceiling to be 26 gauge stucco embossed galvalume

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
CENTRAL KITCHEN

- 8 - Exposed exterior ceiling to match exposed exterior wall finish
- 9 - Interior/exterior doors and door frames to be have 36" high 1/8" diamond tread aluminum kick plate, installed flush with remaining finish - remainder of door and frame to be 18 gauge stainless steel and to include a 14" x 24" heated view window in each door
- S - Insulation to be 4" thick high pressure impingement mixed, foamed-in-place urethane, minimum 2.2 lb. per cubic foot density, fully heated cured and bonded to metal finishes
- T - Minimum R-value for cooler walls, ceilings, and doors is to be R-32
- U - Minimum R-value for freezer walls, ceilings, and doors is to be R-32
- V - Minimum R-value for cooler and freezer floors is to be R-28
- W - The insulation shall have a 97% closed cell structure
- X - Assembly of the walk-in is to be accomplished by the use of cam-locking mechanisms
- Y - Cam lock spacing on vertical joints shall not exceed 46", or 23" from the junction of vertical and horizontal joints
- Z - Cam locks to be foamed-in-place and anchored securely in the panel by steel wings integral to the lock housing
- AA - Cam locks to be operated through access ports by the use of a hex wrench
- BB - Access ports are to be on the walk-in interior and are to be covered by vinyl snap-in caps after final assembly
- CC - Heated vent port for each freezer compartment
- DD - Provide and install matching stainless steel closure panels between walk-in walls and building walls -Closure panels to be constructed of the same material as the exposed exterior walk-in walls
- EE - Provide and install matching stainless steel closure panels from face of walk-in to a height of 1" above finished ceiling – Closure panels to be constructed of the same material as the exposed exterior walk-in walls
- FF - Provide and install bumper rail on exposed walk-in surfaces - bumper rail to have black rubber bumper insert installed in extruded aluminum channel fastened at 10" and 34" above finished floor
- GG- All light fixtures to be furnished with LED bulbs

FOOD SERVICE EQUIPMENT LISTING

- 1. Dunnage Rack – Eight Required by SPG, Kelmax, Eagle
- 2. Dry and Paper Storage Shelving – Four Tier Mobile Thirty Required by Metro, Eagle, SPG
- 3. Can Storage Rack – Four Required by Channel, Kelmax, Advance
- 4. Stainless Steel Work Table w/Sink – One Required by Custom Fabricator with Faucet by T&S, Fisher
- 5. Can Opener - One Required by Edlund
- 6. 3-Tier Mobile Cart – One Required by Eagle, Lakeside, Piper
- 7. Hand Sink with Faucet – Eight Required by Advance Tabco, Eagle, BK Resources
- 8. Four Compartment Walk-in Cooler/Freezer – One Required by Tafco, American Panel, Thermalrite
- 9. Walk-in Cooler/Freezer Refrigeration Rack System – One Required by ColdZone, Tafco, American Panel, or Thermalrite to service all walk-ins in central kitchen and the two roll-in blast chillers
- 10. Freezer Shelving Four Tier Mobile – Seven Required by Metro, Eagle, SPG

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
CENTRAL KITCHEN

11. Meat Cooler Shelving Four Tier Mobile – Six Required by Metro, Eagle, SPG
12. Dairy Cooler Shelving Four Tier Mobile – Seven Required by Metro, Eagle, SPG
13. Produce Cooler Shelving Four Tier Mobile – Seven Required by Metro, Eagle, SPG
14. Spare Number
15. Spare Number
16. Spare Number
17. Two Bowl Island Prep Sink and Table with Drawers and Overshelf – One Required by Custom Fabricator with Faucet by T&S, Fisher
18. Pre-Rinse Spray Assembly – One Required by T&S, Fisher
19. Two Horsepower Disposer with Control – One Required by T&S, Fisher
20. Ten Quart Food Processor – One Required by Robot Coupe, Waring, Hobart
21. Four Quart Food Processor – One Required by Robot Coupe, Waring, Hobart
22. Roll-in Pan Racks – Twelve Required by New Age, Crescor, Eagle (Five Shown on Plans)
23. Island Work Table w/Tiers of Drawers One Required by Custom Fabricator
24. Food Chopper – One Required by Hobart
25. Automatic Slicer – One Required by Hobart, Globe, Berkel
26. Sixty Quart Mixer – One Required by Hobart, Globe, Univex
27. Ingredient Bin – Three Required by Cambro, Rubbermaide, Piper
28. Twenty Quart Mixer – One Required by Hobart, Globe, Univex
29. Spare Number
30. Spare Number
31. Spare Number
32. Bakery Pan Storage Shelving Four Tier Mobile – Two Required by Metro, Eagle, SPG
33. Double Rack Roll-in Bake Oven Furnished with Six Racks and Matching Type 1 Hood – One Required by Doyon, Bakers Pride, Revent
34. Fire Suppression System for Item 33 – One Required by Ansul, Caddy, Gaylord, Halton
35. Roll-in Blast Chiller – Two Required by American Panel, Thermalrite, Tafco
36. Roll-in Heated Cabinet – Two Required by FWE, Victory, Continental
37. Island General Prep/Cook's Table with Tier of Drawers 30"x152" – One Required by Custom Fabricator
38. Island General Prep/Cook's Table with Tier of Drawers and Sink 30"x128" – One Required by Custom Fabricator with Faucet by T&S, Fisher
39. Ceiling Mounted Pot Rack – One Required by Custom Fabricator
40. Type 1 Baffle Filter Hood w/Ceiling Supply Plenum 66"x366" – One Required by Caddy, Gaylord, Halton
41. Fire Suppression System for Item 40 – One Required by Ansul, Caddy, Gaylord, Halton
42. Type 1 Baffle Filter Hood w/Ceiling Supply Plenum 66"x366" – One Required by Caddy, Gaylord, Halton
43. Fire Suppression System for Item 42 – One Required by Ansul, Caddy, Gaylord, Halton
44. Utility Distribution System 12"x366" – One Required by Caddy, Gaylord, Halton
45. Spare Number
46. Spare Number

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
CENTRAL KITCHEN

47. 60" Griddle - One Required by Garland, US Range, Keating with Gas Quick Disconnect by Dormont, Caddy, Gaylord, Halton
48. Refrigerated Equipment Stand – One Required by Continental, Delfield, Randell
49. Cooking Battery to Include 36" Charbroiler w/Oven Base, 12" Spreader Cabinet, and 4-Burner Range w/Oven Base – One Required by U.S. Range, Garland, Montengue with Gas Quick Disconnect by Dormont, Caddy, Gaylord, Halton
50. 30-Gallon Tilt Skillet w/Faucet – One Required by Cleveland, Groen, Market Forge with Water and Gas Disconnects by Dormont, Caddy, Gaylord, Halton
51. Floor Trough w/Drain Tempering – One Custom Size Unit Required by Eagle
52. 25-Gallon Tilt Kettle w/Faucet – One Required by Cleveland, Groen, Market Forge with Water and Gas Disconnects by Dormont, Caddy, Gaylord, Halton
53. Floor Trough w/Drain Tempering – One Custom Size Unit Required by Eagle
54. 40-Gallon Tilt Kettle w/Faucet – Two required by Cleveland, Groen, Market Forge with Water and Gas Disconnects by Dormont, Caddy, Gaylord, Halton
55. Floor Trough w/Drain Tempering – Two Custom Size Units Required by Eagle
56. Spare Number
57. Roll-in Combi Oven/Steamer – Two Ovens Required by Alto Shaam, Rational, Cleveland with Gas and Water Disconnects by Dormont, Caddy, Gaylord, Halton and Water Filters by Everpure, AltoShaam, Rational, Cleveland
58. Roll-in Combi Oven Racks – Eight Required by Alto Shaam, Rational, Cleveland
59. Double Deck Combi Oven/Steamer – One Double Stacked Oven Required by Alto Shaam, Rational, Cleveland with Gas and Water Disconnects by Dormont, Caddy, Gaylord, Halton, and Water Filters by Everpure, Alto Shaam, Rational, Cleveland
60. Double Deck Convection Oven - One Oven Required by U.S. Range, Garland, Lang with Gas Quick Disconnect by Dormont Caddy, Gaylord, Halton
61. Fryer System with Two 60 lb. Fryers, Dumpstation w/Heatlamp, and Built-in Filtration - Two Fryer Batteries Required by Dean, Pitco, Frymaster with Gas Quick Disconnects by Dormont, Caddy, Gaylord, Halton
62. Spare Number
63. Spare Number
64. Hot Holding Cabinet – Two Required by Metro, Crescor, or AltoShaam
65. Island Table with Sink – One Required by Custom Fabricator with Faucet by T&S, Fisher
66. 2-Section Pass-Through Heated Cabinet – One Required by Victory, Continental, Traulsen
67. Island Table – One Required by Custom Fabricator
68. Hot Food Transport Cart – Fifteen Required by Cambro
69. Cart Staging Cooler – One Required by Tafco, American Panel, Thermalrite
70. Soda Rack System - One Required by Owner's Beverage Vendor
71. Cold Food Transport Carts – Fifteen Required by Cambro
72. Air Curtain Refrigerator – Three Required (Two Shown on Plans) by Victory, Traulsen, Continental
73. Beverage Counter w/Drain Trough – One Required by Custom Fabricator
74. Glass Rack Dollies – Eight Required by Cambro, Metro, Eagle
75. Coffee Brewer – One Required by Beverage Vendor
76. Juice Dispenser – One Required by Beverage Vendor
77. Soda Rack System with Beverage Gun – One Required by Beverage Vendor
78. Ice/Water Dispenser – One Required by Hoshizaki, Scotsman, Manitowoc with Water Filter by Everpure, Hoshizaki, Scotsman, Manitowoc

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
CENTRAL KITCHEN

79. Dome Storage Racks – Two Required by Aladdin, Dinex, Piper
80. Tray Roller Conveyor with Electrical Chase and Overshelf 20"x168" – One Custom Unit Required by Caddy, Dinex, Aladdin, Piper
81. Tray Starter Station – One Required by Caddy, Aladdin, Dinex, Piper
82. Trayline Shelving Four Tier Mobile Unit – One Section Required by Metro, Eagle, SPG
83. Base Storage Rack – Two Required by Aladdin, Dinex, Piper
84. Induction Base Heater Table – One Required by Custom Fabricator
85. Induction Base Heater – One Required by Aladdin, Dinex, Piper
86. Heated Plate Dispenser – Three Required (Two Shown on Plans) by Caddy, Dinex, Aladdin, Piper
87. Four Well Steam Table – One Required by Caddy, Dinex, Aladdin, Piper with Drain Tempering Device by Cool Drain Flow Inc.
88. Conveyor Toaster Stand– One Required by Custom Fabricator
89. Conveyor Toaster – One Required by Hatco, Star, APW
90. Tray Delivery Cart – Exact Cart and Quantity to be selected by Owner (Minimum of 30 Carts Required) by, Caddy, Dinex, Aladdin, Piper
91. Clean Dish Dolly – Two Required by Cambro, Metro, Eagle
92. Spare Number
93. Spare Number
94. Spare Number
95. Power Wash Sink with Overshelf – One Custom Sized Unit by Power Soak or Champion with Faucet by T&S or Fisher, Unit to include 78" Soiled Drain Board, 18" Scrap Sink w/12" Drainboard, 54" Wash Sink, 24" Rinse and Sanitize Sinks, and 40" Clean Drainboard
96. Pre-Rinse Spray Assembly – One Required by T&S, Fisher
97. Three Horsepower Disposer with Control – One Required by Insinkerator, Salvajor, Hobart
98. Clean Storage Shelving Four Tier Mobile – Eight Sections Required by Metro, Eagle, SPG
99. Three Tier Utility Cart – One Required by Eagle, Lakeside, SPG
100. Chemical Storage Shelving Four Tier Stationary – One Required by Metro, Eagle, SPG
101. Hose Assembly with Recessed Control Cabinet – One Required by T&S, Fisher
102. Floor Trough– One Required by Custom Fabricator, Eagle, Steelkor
103. Eye Wash Assembly – One Required by T&S, Fisher
104. Soiled Dishtable with Rack Overshelf and Pre-rinse Sink – One Required by Custom Fabricator
105. Pre-Rinse Spray Assembly – One Required by T&S, Fisher
106. Three Horsepower Disposer with Control – One Required by Insinkerator, Salvajor, Hobart
107. Conveyor Dishmachine – One Required by Hobart, Champion, Meiko
108. Clean Dishtable with Overshelf – One Required by Custom Fabricator

BASIS OF DESIGN EQUIPMENT SPECIFICATION SHEET SELECTIONS SHALL BE SHARED PRIOR TO PHASE 2 TECHNICAL SUBMISSIONS.

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE HOUSEHOLD SERVING KITCHENS

HOUSEHOLD SERVING KITCHEN FOODSERVICE NARRATIVE

The household serving kitchens will be receiving prepared cold and hot food from the main serving for support of the residents in the households. All dishes, glasses, and utensils will be washed in the back pantry space with all bulk food pans returning to the main kitchen for washing.

The dining space will include a residential refrigerator freezer to be used for nourishments and a residential wall oven for special activity use by the residents. All residential appliances are not included in the commercial food service equipment scope and will be specified by the architect.

The cabinetry will be millwork with a residential appearance. Stainless steel base cabinetry will be used in wet high use areas with open indirect wastes below sinks, dishwashers, hot food wells, ice/water dispensers and any items requiring an indirect waste connection. These stainless-steel base cabinets will be covered with millwork faces to create a residential kitchen appearance.

All equipment unless hard plumbed or hard wired is to be mounted on casters.

Any coffee, juice, iced tea, and other beverage equipment required is excluded from the commercial kitchen equipment list and will be considered by owner or by beverage vendor. Exact requirements will be coordinated with owner and the food service consultant to ensure proper space and utility requirements are being accounted for. The food service equipment contract will have no related scope for these items.

Equipment specification sheets have been included to represent the basis of design in terms of utility requirements, performance features, and accessories required for this project. The equipment list for each item includes alternate manufacturers that can be considered as approved alternates.

HOUSEHOLD KITCHEN FOOD SERVICE EQUIPMENT LIST

- 200. Drop-in Hand Sink w/Faucet – Fourteen Required by Eagle, Advance and with Faucets by T&S
- 201. Drop-in General Purpose Sink– Fourteen Required by Eagle, Advance with Faucet by Others
- 202. Blender – Fourteen Required by VitaMix, Hamilton Beach, Waring
- 203. 27” Wide Undercounter Freezer – Fourteen Required by Continental, Randell, Delfield
- 204. Microwave Oven – Fourteen Required by Amana, Panasonic, Waring
- 205. Type I Exhaust Hood – Fourteen Required by Caddy, Gaylord, Halton
- 206. Ansul R-102 Fire Suppression System – Fourteen Required by Ansul, Caddy, Gaylord, Halton
- 207. 30” Wide Induction Range w/Convection Oven Base – Fourteen Required by Lang
- 208. 48” Wide Undercounter Refrigerator – Fourteen Required by Continental, Randell, Delfield
- 209. Four Slice Pop-up Toaster – Fourteen Required by Toastmaster, Star, Hobart
- 210. Undercounter Induction Warming System – Fifty-six Required by CookTek, Hatco

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
HOUSEHOLD SERVING KITCHENS

- 211. Countertop Ice/Water Dispenser w/Water filter – Fourteen Required by Follett, Scotsman, Manitowoc
- 212. Two Bowl Drop-in Sink– Fourteen Required by Eagle, Advance and Faucet by Others
- 213. Stainless Steel Base for General Purpose Sink – Fourteen Required by Custom Fabricator
- 214. Stainless Steel Base for Ice/Water Dispenser – Fourteen Required by Custom Fabricator
- 215. Stainless Steel Base for Two Bowl Drop-in Sink – Fourteen Required by Custom Fabricator
- 216. Stainless Steel Base for Pre-Rinse Sink and Dishmachine – Fourteen Required by Custom Fabricator
- 217. Fabricator
- 218. Three Tier Bussing Cart – Fourteen Required by Lakeside, Piper, Eagle
- 219. Undercounter Dishmachine – Fourteen Required by Hobart, Champion
- 220. Drop-in Pre-Rinse Sink – Fourteen Required by Eagle and Faucet by Others
- 221. Two Section Upright Freezer – Six Required by Continental, Victory, Traulsen
- 222. Two Section Upright Refrigerator – Six Required by Continental, Victory, Traulsen
- 223. Five Tier Storage Shelving – Fifty-four Sections Required by Metro, Eagle, SPG
- 224. Hand Sink – Eight Required by Advance Tabco, Eagle, BK Resources
- 225. Coffee Brewer – Fourteen Required by Beverage Vendor
- 226. 1/2 Horsepower Disposer – Fourteen Required by Insinkerator
- 227. Two Section Upright Refrigerator/Freezer – Two Required by Continental, Victory, Traulsen

BASIS OF DESIGN EQUIPMENT SPECIFICATION SHEET SELECTIONS SHALL BE SHARED PRIOR TO PHASE 2 TECHNICAL SUBMISSIONS.

PUB/CAFE FOODSERVICE NARRATIVE

The Pub/Café is currently programmed to be between 1,500 and 2,000 square feet. This venue will be programmed as a fast-casual venue. The menu will include grab-n-go premade items, barista style drinks, traditional hot coffee drinks, iced coffees, made to order cold sandwiches, and grilling area with Type 1 Hood. Other specialty beverages and sodas will be merchandised in grab-n-go style refrigerated units. A back of house support area with refrigerated storage, dry food storage, paper storage, and a scullery zone will be required to support this venue. The front cafe counter will be included in the food service equipment package. This counter will be constructed to have a stainless-steel base cabinet with doors, quartz top, with all customer facing counter fronts finished in millwork paneling as selected by the architect. Trash, condiment, and bussing counters required to support this space are not included in the food service equipment contractor's scope of work. The main kitchen will support these spaces in terms of rough food prep and centralized receiving and storage. Localized storage is included in the back of house pantry space for dry goods, paper products, and cold storage to support the daily function of these spaces.

All beverages will be full service to the customer. A sods gun with bag in box system has been programmed for the pub area. Soda equipment will be furnished by the owner's beverage vendor

The Pub/alcohol service portion of this program will include bar refrigeration, liquor storage, and cocktail station. All alcoholic beverages will be served by the bottle or in glass. A draft beer system is not included based on expected low volume of service and for ease of end user maintenance.

All equipment unless hard plumbed or hard wired is to be mounted on casters. Gas fired equipment is to include a gas hose disconnect.

Equipment specification sheets have been included to represent the basis of design in terms of utility requirements, performance features, and accessories required for this project. The equipment list for each item includes two alternate manufacturers that can be considered as approved alternates.

FOOD SERVICE EQUIPMENT LISTING

300. Drop-in Hand Sink by Eagle, Advance with Faucet by T&S, Fisher
301. Drop-in General Purpose Sink with Faucet by Eagle, Advance
302. Blender by VitaMix, Waring, Hamilton Beach
303. Undercounter Ice Maker by Hoshizaki, Scotsman, Manitowoc with Water Filter by Everpure, Hoshizaki, Scotsman, Manitowoc
304. Heated Dipperwell by Wells, Server
305. Espresso Machine with Water Filter by Franke, Schaerer
306. Airpot Coffee Brewer by Beverage Vendor
307. Airpots by Bunn (Six Required)
308. 48" Undercounter Refrigerator by Continental, Delfield, Randell
309. Rapid Cook Oven by Turbochef, MerryChef, Amana
310. Built-in Grab-n-Go Merchandiser by Structural Concepts, OscarTek, Masterbilt, Oscartielle (Two Required)
311. Bonded Glass Bakery Display by BSI, Premier (Two Required)
312. Point of Sale Station – Not Included, Item by Owner (Three Required)
313. Built-in Cup Dispensers by San Jamar, Server, Winco (Three Required)
314. 27" Wide Undercounter Freezer by Continental, Randell, Delfield(Two Required)

COMMERCIAL FOOD SERVICE EQUIPMENT NARRATIVE
PUB/CAFE

- 315. Toppings/Prep Refrigerator by Continental, Randell, Delfield
- 316. 5'-0" x 10'-0" Type 1 Hood by Caddy, Gaylord, Halton
- 317. Ansul R-102 Hood Fire Suppression System by Ansul, Caddy, Gaylord, Halton
- 318. Spare Number
- 319. Fryer by Frymaster, Pitco, Dean with Gas Quick Disconnect by Dormont,
Frymaster, Pitco, Dean
- 320. Refrigerated Equipment Stand with Cutting Board by Continental, Delfield, Randell
- 321. 36" Griddle by Garland, Keating, Star with Gas Quick Disconnect by Dormont,
Garland, Keating, Star
- 322. 18" Charbroiler by Garland, Star, Vulcan with Gas Quick Disconnect by Dormont,
Garland, Star, Vulcan
- 323. 4-Slice Toaster by Hatco, Star, APW
- 324. 5-Tier Shelving by Metro, Eagle, SPG (Four Required)
- 325. Hand Sink by Advance Tabco, Eagle, BK Resources
- 326. Two Section Refrigerator by Continental, Victory, Traulsen
- 327. One Section Freezer by Continental, Victory, Traulsen
- 328. Ice Maker with Bin by Scotsman, Hoshizaki, Manitowoc with Water Filter by
Everpure, Scotsman, Hoshizaki, Manitowoc
- 329. 6'-0" Stainless Steel Soiled Dishtable with Rack Overshelf and Pre-Rinse Sink by
Custom
Fabricator
- 330. Pre-Rinse Spray Assembly by T&S, Fisher
- 331. 1-HP Disposer w/Controls by Insinkerator, Salvajor, Hobart
- 332. Upright Single Door Ventless Dishmachine by Hobart, Champion, Meiko
- 333. 6'-0" Stainless Steel Soiled Dishtable with Rack Overshelf and Pre-Rinse Sink by
Custom
Fabricator
- 334. Soda Rack System by Beverage Vendor
- 335. Soda Gun by Beverage Vendor
- 336. Spare Number
- 337. Spare Number
- 338. Drainboard with glass storage by Glastender, Perlick, Krowne
- 339. Cocktail Station with Speed Rail by Glastender, Perlick, Krowne
- 340. Three Bowl Sink with Speed Rail by Glastender, Perlick, Krowne
- 341. Hand Sink by Glastender, Perlick, Krowne
- 342. Trash Chute by Glastender, Perlick, Krowne
- 343. Back Bar Cooler by Glastender, Perlick, Krowne
- 344. Slide Top Bar Cooler by Glastender, Perlick, Krowne
- 345. Coffee/Bake Service Counter by Custom Fabricator
- 346. Coffee/Bake Work Counter by Custom Fabricator
- 347. Hand Sink/Grill Counter by Custom Fabricator
- 348. Pub Counter by Custom Fabricator
- 349. Grill Plating Counter by Custom Fabricator

BASIS OF DESIGN EQUIPMENT SPECIFICATION SHEET SELECTIONS SHALL BE SHARED
PRIOR TO PHASE 2 TECHNICAL SUBMISSIONS.

1. APPLICABLE CODES AND GUIDELINES

- 1.1 ILLINOIS ACCESSIBILITY CODE, 2018 MINIMUM STANDARD
- 1.2 AMERICANS WITH DISABILITY ACT, 2010 OR STANDARDS FOR ACCESSIBLE DESIGN ONLY WHERE MORE STRINGENT THAN IAC&ABAS
- 1.3 IBC, 2018
- 1.4 NFPA 70-NATIONAL ELECTRIC CODE, 2011
- 1.5 NFPA 99-HEALTHCARE FACILITIES CODE, 2012
- 1.6 NFPA 110-EMERGENCY AND STANDBY POWER, 2010
- 1.7 NFPA 780-STANDARD FOR THE INSTALLATION OF LIGHTING PROTECTION SYSTEMS, 2011
- 1.8 NFPA 101-LIFE SAFETY CODE, 2012
- 1.9 ILLINOIS DEPARTMENT OF PUBLIC HEALTH
- 1.10 ADAMS COUNTY WITH LOCAL AMENDMENTS
- 1.11 INTERNATIONAL MECHANICAL CODES, 2018
- 1.12 INTERNATIONAL ENERGY CONSERVATION CODE, 2018
- 1.13 ALL OTHER VETERANS HOME CODES APPLICABLE TO QUINCY VETERANS HOME AND GUIDELINES FROM CDB.

2. NARRATIVE SUMMARY

2.1 CAMPUS MEDIUM VOLTAGE (MV) DISTRIBUTION REPLACEMENT

- A. As per design team recommendation and CDB approval, the medium voltage distribution system will need to be replaced to accommodate the phased plan for new buildings and renovation of existing buildings electrical distribution. The phasing plan will be submitted by Design Builder Entity (DB)E and shall take approval from owner and CDB. In lieu of reliability and future growth of campus, 300 amp loop with switches to serve buildings is recommended. A loop type configuration with sectionalizing switches provide the flexibility necessary for phasing. The future expansions and renovations shall be done with minimal interruptions to power and disturbance to site and campus normal operation. The existing 2400V and the new 12.47kV systems will operate together until all the existing loads on this campus are transferred to the new 12.47kV system. DBE to coordinate with Ameren for all the MV and building distribution work before commencing and while performing the work. This work will be closely coordinated with facility personnel and all other engineering trades and utilities present on site, before any building is taken off the existing system. In addition, other site utility upgrades are a part of this project, therefore this contractor shall to coordinate all work with owner, civil design and other site utility work on this project.

The drawings and design presented is not final product. The intent of these documents is not to describe or finalize design but rather to present a design approach requested by CDB to guide DBE. DBE responsibility to provide final design and construction with the approval of CDB. See S-E000, S-E101, S-E102 and S-E103 for more details.

The MV loop system is recommended to be installed as one complete system in one phase rather than breaking into several small phases in order to minimize power disruptions and site disturbance. Phasing plan will be needed to energize existing buildings new electrical distribution load from new MV system.

2.2 NEW MV SYSTEM 12.47KV:

- A. New Utility Switchyard will consist of utility provided manual transfer switch between the two (2) existing utility 12.47kV feeds. Ameren will provide and install manual transfer switch. DBE to coordinate with Ameren for metering and grounding of services. The main switchgear construction shall be fused type and will be rated at 600 amp. DBE to provide lightning, surge, short circuit and ground fault protection for the main switchgear and provide grounding grid and testing holes as per Ameren and NEC 250. The main electrical switchgear shall have grounding ring around entire equipment with minimum of six ground rods $\frac{3}{4}$ " x 10' at each corner and midpoints along length. All grounding throughout the campus shall be bonded together.

Feeder from manual transfer will enter the main switchgear into the disconnect and will be metered in next switch gear bay. The load on each feeder going out shall be metered. Bay-7 shall have provision for future campus wide generator. The generator bay shall have all the interlocking and relays necessary for complete working system. DBE to coordinate with utility (Ameren Illinois-Roger Donaldson at, Office 217 221-0805, Cell-217 257-1516, email-rdonaldson@ameren.com).

All electrical equipment shall be mounted on reinforced concrete pad/footings to assure no frost heaving. DBE responsibility to provide concrete base to prevent heaving. it is highly recommended that new metal enclosed service switches are either housed in a pre-fabricated, weather proof enclosure or configured so the equipment has an enclosed operational area with safety clearances per NFPA 70/70E; all outdoor switch sections shall have heaters to avoid condensation and icing of the interiors and mechanisms; all switches shall have surge protection; all entry of equipment enclosures and operational switches shall be lockable via padlocks with broach protected key systems to meet the Using Agency (IVHQ) standards so the keys cannot be readily copied without authorization; all switches shall be capable of confirmation of switch positions.

Air or Vacuum Break Pad Mounted Sectionalizing Switches with Integral Fused Disconnects for Building Services; loop switches shall be 15kV/600A minimum and be gang operated, branch feed switches shall be 200A; DBE to finalize decision in coordination with owner for open switch in the loop. Mechanism needs to be provided in order to protect closing of open switch mistakenly. Switch bases shall be corrosion resistant stainless steel to avoid corrosion at the base; all switches shall be capable of confirmation of switch positions either visibly or by mechanical indicator; all switches shall have surge protection;

Duct banks should include a minimum of (2) 5" (for 12.47KV system) and (4) 5" (for communication system) PVC schedule 40 encased in reinforced concrete and be supported and spaced using conduit

support/spacers; inter duct separation shall be provided in four communication ducts. See S-E101 more details. Duct bank system shall be installed as per NFPA 70/70E.

For long life and ease of future changes, pre-cast concrete manholes are the preferred pull boxes for cable directional changes or routing to pad mounted switches and transformers or to building unit substations; manholes MUST be sized larger than minimum provided in NFPA 70 – NEC to allow for future entries from all sides of the box; suggested minimum of 4' x 7' x 7'D but sizing may be larger to accommodate large duct banks for distribution from the main service switchgear; manhole covers/collars for entry should be no smaller than 36" diameter; cable pulling rings should be standard; sump holes should be provided directly beneath and vertically aligned with the manhole cover to allow a portable submersible pump to be lowered for removal of water prior to entry; cable supports should be provided on all sides and coordinated for each manhole based upon duct/cable entries. DBE to provide hand holes and coordinate with IT consultant for the requirements of communication handholes. Handholes shall be sized as per IT consultant requirements and shall be installed as per NFPA 70/70E.

MV cable should be shielded EPR type, copper, MV-105 (133%) to assure long life and performance. All switches and transformers shall be provided with a 'ground ring' with a minimum of two (2) corner located driven ¾"x 10' ground rods and shall be bonded to the ground conductor of the distribution system to assure a common ground potential field due to the open campus space being subjected to induced lightning voltage surges; all medium voltage circuits shall include a copper ground conductor connected to the grounding electrode system at the new main campus service switchgear.

All equipment and cabling will be tested to Inter-National Electrical Testing Association Maintenance Testing Standards (ANSI/NETA MTS) using an approved method to provide a 'baseline' for future maintenance testing; it is highly recommended to use testing other than DC High Potential so the data can be tracked over time; a suggested alternative for cable testing is Very Low Frequency AC (VLF) Insulation Resistance in conjunction with VLF – Tangent Delta (VLF-TD) to create a baseline for future maintenance testing; equipment testing should follow NETA standards for medium voltage equipment acceptance.

2.3 EXISTING BUILDING ELECTRICAL SERVICE

- A. DBE to replace all the existing obsolete panels keeping safety and operation in mind and in order to make the existing buildings distribution compatible with new proposed system. The existing buildings distribution will be replaced to be compatible with 277/480 V system. See sheet S-E103 for work needed to be done in each building. DBE to provide final sizes for all the buildings switchgears. The intent of this drawing is to provide approach to upgrade the existing obsolete and hazardous electrical system. All the main switchgear of the existing buildings will need to be replaced with new in order to provide 277/480 V service, unless 120/208 V system is needed in some buildings. DBE to provide new grounding for each building transformers, switchgears and electrical panels as per NEC 250. Each building has to be connected to the new 12.4kV system. All work on this new electrical loop has to be closely coordinated with other new and existing utilities on the campus. Metering shall be provided on all switchgears. DBE to provide new lighting fixtures, lighting panel, power panel and lighting controls for open auditorium.

DBE shall be responsible for the demolition work planned for buildings and tunnels including Neilson building. Coordinate with architecture drawings for the scope of demolition work. DBE shall be responsible for electrical work require to refeed normal and emergency power to buildings and site lighting disturb due to demolition. New lighting and receptacles shall be provided in new tunnels and utility corridors.

2.4 LONG TERM CARE BUILDING:

A. Main Switch gear:

The electrical service for new building will be fed from the new medium voltage distribution system to an outdoor transformer and will be fed to new 277/480V, 3 phase main switchboard. Sizing of a new main distribution/service switchboard will be DBE responsibility. Main switch board bus shall be design accommodating the solar load. Power for 120/208V will be furnished via dry-type distribution transformers (copper winding) to step down voltage from 480 V. 120/208V power will be provided for receptacles and equipment and systems which require 120/208 V power. Mechanical equipment for heating and ventilation and lighting will typically be at 480V/ 3 phase. 480V, 3pahse will be design for anything above one (1) horsepower (HP) motor. Fractional HP equipment will be either 120/208V single or three phase.

A. Electrical Building Distribution:

All distribution systems should include arc fault labeling based upon code required analysis per NFPA 70E – National Electrical Safety Code (current). All distribution should be designed with overcurrent device selective coordination and where required by NFPA 70, ground fault protection. If the ground fault protection is required by NFPA 70 based upon size and voltage of the service then an additional level of ground fault protection shall be provided as noted in NFPA 70-517. DBE to provide adjustable trip type breakers for all feeder breakers.

All feeders shall be made of copper. All motor controls should be NEMA type. All wiring devices should be heavy duty commercial grade. ESS sourced receptacles shall be identified by red devices and cover plates. Resident room bed headwall should have a minimum of four (4) duplex receptacles of which two (2) shall be sourced from the ESS. DBE to separate emergency and normal power as per NEC 700 and 517. DBE to coordinate with IT/security/system drawings for their requirement for power, conduit, conductors and boxes. DBE to coordinate with IT drawings for Floor boxes requirement, shall provide receptables, boxes, conductor and conduits in those location. DBE to coordinate with laundry, kitchen drawings for their requirements of power. Advance metering shall be provided as per LEED v4 – **4.1 BD+C NC E&A Advanced Energy Metering** requirements and goals. Electric Car charging in parking shall be provided as per **LEED v4 – 4.1 BD+C NC Location and Transportation: LTc8: Electric Vehicles** requirements and goals. DBE to provide fire pump disconnect/controls installation as per NEC 695. Complete Lightning protection System will be provided on roof which shall include dedicated grounding system and shall be installed as per NFPA 780 and UL 96&96A.

B. Essential Electrical System:

Provide a new Essential Electrical System (ESS) which complies with NFPA 70- National Electrical Code (2011), NFPA 110- Standard for Emergency and Standby Power Systems (2012) and NFPA 101 – Life Safety Code (2012). The ESS will meet the NFPA 110 and NFPA 99 requirements for

Level 1, Type 10, Class X system (two branch – life safety and equipment. See Single Line Diagram for more details. 96 hour fuel supply will be needed for generator operation as per code and IDPH. DBE to provide final sizing for generator. DBE to provide remote shunt trip and all fuel management controls as per NFPA 70/110. LTC will be category 2 and type 2nd EES as per NFPA 99 and NFPA 70. DBE to provide time delay in seconds for heavy loads such as chillers, AHU and pumps. Time delay sequencing shall be done by providing signal from ATS to breaker of the equipment and by tying up to building automation. Sequence shall be done with the coordination of owner and mechanical engineer. Generator shall be approved for hospital applications and shall have features for fuel efficiency, air cleaner, advanced short circuit capability, EPA, CSA, IBC, NFPA and UL certified etc. DBE to coordinate with all trades for emergency power requirements for equipment. Walk in cooler, freezer, exhaust fans, make up unit, and fire suppression system need to be on emergency power. Coordinate with kitchen consultant for emergency power requirements.

ELECTRICAL NARRATIVE – Webb Engineering Services Inc.

LIFE SAFETY BRANCH		AMPS	KVA	NOTES
EGRESS, EXIT SIGN LIGHTING		48.1	40	
FIRE ALARM, MEDICAL GAS ALARM ETC		3.6	3	
LIGHTING DINING, CHAPEL		6.0	5	
COMMUNICATION SYSTEM		1.2	1	
GENERATOR LOAD		0.6	0.5	
ELEVATOR LIGHTING, CONTROL, SYSTEM		1.2	1	
TOTAL		60.8	50.5	
EQUIPMENT BRANCH				
PATIENT ROOM LIGHTING		18.1	15	
PATIENT ROOM RECEPTACLE		60.2	50	
NURSE STATION RECEPTACLE		7.2	6	
SMOKE CONTROL AND STAIR PRESURRIZATION		0.0	0	
KITCHEN HOOD AND EXHAUST SYSTEM		72.2	60	
SUMP/EJECTOR PUMP		18.1	15	
TOTAL		175.7	146	
HEATING EQUIPMENT LOAD/HVAC	SHALL BE INCLUDED IN EQ BRANCH			
CHILLERS	TOTAL 3, 2 WORK AT A TIME, 200 TON	558	463.698	
PRIMARY PUMP	TOTAL 3, 2 WORK AT A TIME, 20HP	52	43.212	
FIRE PUMP	50HP	65	54.015	
SECONDARY PUMP	TOTAL 3, 2 WORK AT A TIME, 40 HP	104	86.424	
AHU EF, CD	TOTAL TWO, 438 AMPS EACH	876	727.956	
ACC	TOTAL 6, 4 WORK AT A TIME, 24.8 AMPS	99.2	82.4352	
BOILER	TOTAL 3, 2 WORK AT A TIME, 5 HP	5.2	4.3212	
PRIMARY HEATING PUMP	TOTAL 3, 2 WORK AT A TIME, 20 HP	52	43.212	
SECONDARY HEATING WATER	TOTAL 3, 2 WORK AT A TIME, 40 HP	104	86.424	
FANCOIL	TOTAL 210 ROOM, 1/2 HP EACH	124	103.044	
VACCUM PUMP	SINGLE, 10 HP	14	11.634	
MEDICAL GAS COMPRESSOR	SINGLE, 15 HP	21	17.451	
MEDICAL GAS SYSTEM	SINGLE	3	2.493	
ELEVATOR LOAD	2 ELEVATORS, 50HP	130	108.03	
IT COOLING GYCOL WATER PUMP	10HP	14	11.634	
IT COOLING CONDENSER FAN	12HP	18	14.958	
IT COOLING UNIT	76.5KW UNIT	115	95.565	
IT load		100	83.1	
Nurse call system		3	2.493	
Total		2457.4	2042.1	
TOTAL (ALL branch)		2693.9	2238.6	KVA
			1790.88	KW
	80% LOADING		2238.6	KW
			2250	KW

C.

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 Electrical Narrative

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 Bridging Documents

D. Lighting:

DBE to provide LED based networked lighting systems throughout the building. Correlated Color Temperature (CCT) tunable fixtures (color tuning-technique to adjust the color of the light fixture) shall be provided and shall be limited to a range of 2700°K to 6500°K for indoor lighting in patient rooms. Patient room fixture CCT shall be maintained as per schedule. Capability to control or override the patient room fixture CCT shall be provided at each nurse station. Overall color rendering quality should be limited to 80+ CRI (Color Rendering Index) or greater for all lighting. Lighting levels should be established per the Illuminating Engineer Society (IES) standards for senior living environment to assure adequate levels. Controls/dimming shall be provided in each patient room and all other areas as per Energy Codes and LEED requirements, See lighting sheets. General lighting for other than resident areas such as offices, toilets, storage and mechanical/electrical rooms should use fixed CCT of 3500°K with 80+ CRI to mimic a 'neutral' environment. Controls should include occupancy/vacancy sensing and dimming capability for all transient areas such as toilets, offices and corridors (per Energy Codes and LEED requirements). Daylighting harvesting with dimming and dimming controls will be needed in some windowed areas to meet the energy code requirements and LEED points. DBE to provide fixtures designed for particular areas. For example kitchen shall have sealable lens fixture to avoid fungus fertilization and for easy cleaning. All lighting shall fulfill requirements of LEED.

DBE responsibility to provide task lighting/egress illumination and emergency lighting necessary for recreational areas and dinning. DBE to provide pathway lighting to nearest parking and shall provide these lights on emergency power.

LEED- All lighting shall fulfill requirements of LEED v4 – v4.1 IAQ-Interior Lighting: Option 1: Lighting Control and Option 2: Lighting Quality. All lighting in the entire project shall be LED based. DBE responsibility to achieve two credits in LEED v4 – v4.1 Interior Lighting category.

E. Solar/PV:

Solar array will be provided to generate renewable energy to support building LEEDs goal. Renewable energy production shall be provided as per LEED v4 – **4.1 BD+C NC E&A Renewable Energy Production** requirements and goals. Preliminary analysis is being shown, See sheet L-E701 for Solar Analysis for more details. Further analysis needs to be done by DBE to calculate exact generation and size. Solar panel efficiency shall be greater than 21%. DBE to use most efficient panels at the time of construction. Warranty shall include material and performance for at least 20 yrs. Electrical equipment shall be rated for solar use and UL listed. All equipment warranty shall be at least for 10 yrs and shall have efficiency of more than 97%. All cables/wiring (PV wire) shall be approved by UL for solar application. DBE responsibility to find and coordinate with agencies which can help in funding the project.

2.5 DOMICILIARY BUILDING –

A. Main Switch gear:

The electrical service for new building will be fed from the new medium voltage distribution system to an outdoor transformer and will be fed to new 277/480V, 3 phase main switchboard. Sizing of a new main distribution/service switchboard will be DBE responsibility. Main switch board bus shall be design accommodating the solar load. Power for 120/208V will be furnished via dry-type distribution transformers (copper winding) to step down voltage from 480 V. 120/208V power will be provided for receptacles and equipment and systems which require 120/208 V power. Mechanical equipment for heating and ventilation and lighting will typically be at 480V/ 3 phase. 480V, 3pahse will be design for anything above one (1) horsepower (HP) motor. Fractional HP equipment will be either 120/208V single or three phase.

B. Electrical Building Distribution:

All distribution systems should include arc fault labeling based upon code required analysis per NFPA 70E – National Electrical Safety Code (current). All distribution should be designed with overcurrent device selective coordination and where required by NFPA 70, ground fault protection. DBE to provide adjustable trip type breakers for all feeder breakers.

All feeders shall be made of copper. All motor controls should be NEMA type. All wiring devices should be heavy duty commercial grade. ESS sourced receptacles shall be identified by red devices and cover plates. Resident room bed headwall should have a minimum of four (4) duplex receptacles of which two (2) shall be sourced from the ESS. DBE to separate emergency and normal power as per NEC 700 and 517. DBE to coordinate with IT/security/system drawings for their requirement for power, conduit, conductors and boxes. DBE to coordinate with IT drawings for Floor boxes requirement, shall provide receptables, boxes, conductor and conduits in those location. Advance metering shall be provided as per LEED v4 – **4.1 BD+C NC E&A Advanced Energy Metering** requirements and goals. Electric Car charging in parking shall be provided as per **LEED v4 – 4.1 BD+C NC Location and Transportation: LTc8: Electric Vehicles** requirements and goals. DBE to provide fire pump disconnect/controls installation as per NEC 695. Complete Lightning protection System will be provided on roof which shall include dedicated grounding system and shall be installed as per NFPA 780 and UL 96&96A.

C. Essential Electrical System:

Provide a new Essential Electrical System (EES) which complies with NFPA 70- National Electrical Code (current), NFPA 110- Standard for Emergency and Standby Power Systems (2012) and NFPA 101 – Life Safety Code (2012). See Single Line Diagram for more details. DBE to finalize the size of generator. DBE to provide remote shunt trip and all fuel management controls as per NFPA 70/110. Generator shall be approved for commercial applications and shall have features for fuel efficiency, air cleaner, advanced short circuit capability, EPA, CSA, IBC, NFPA and UL certified etc. DBE to coordinate with local authorities to make sure if we can have life safety load and other loads on same ATS since DOM is not healthcare building as per NFPA 99 and NFPA 70. Life safety wiring shall be separate from the other emergency loads. Branches shall be provided as per 701, 702 and legally required branch for life safety.

LOAD	DETAILS	AMPS	NOTE
ELEVATOR	ONE ELEVATOR ON EMERGENCY	65	ALL SIZES NEED TO BE FINALIZE BY DBE
FCU	80 units, 1/2 hp	52	
FIRE PUMP	50 HP	65	
LIFE SAFETY	LIGHTING AND RECEPTACLE	25	
IT LOAD		50	
GENERATOR LOAD		3	
	TOTAL AMPS	260	
	TOTAL KVA	216.06	
	TOTAL KW	172.848	
GEN SIZE (80% LOADING)		216.06	
FINAL GEN SIZE KW		225	

D. Lighting:

DBE to provide LED based networked lighting systems throughout the building. Overall color rendering quality should be limited to 80+ CRI (Color Rendering Index) or greater for all lighting. Lighting levels should be established per the Illuminating Engineer Society (IES) standards for senior living environment to assure adequate levels. Controls/dimming shall be provided in each patient room and all other areas as per Energy Codes and LEED requirements, See lighting sheets. General lighting for other than resident areas such as offices, toilets, storage and mechanical/electrical rooms should use fixed CCT of 3500°K with 80+ CRI to mimic a 'neutral' environment. Controls should include occupancy/vacancy sensing and dimming capability for all transient areas such as toilets, offices and corridors (per Energy Codes and LEED requirements). Daylighting harvesting with dimming and dimming controls will be needed in some windowed areas to meet the energy code requirements and LEED points. DBE to provide fixtures designed for particular areas. For example kitchen shall have sealable lens fixture to avoid fungus fertilization and for easy cleaning. All lighting shall fulfill requirements of LEED.

DBE responsibility to provide task lighting/egress illumination and emergency lighting necessary for recreational areas and dinning. DBE to provide pathway lighting to nearest parking and shall provide these lights on emergency power.

LEED- All lighting shall fulfill requirements of LEED v4 – v4.1 IAQ-Interior Lighting: Option 1: Lighting Control and Option 2: Lighting Quality. All lighting in the entire project shall be LED based. DBE responsibility to achieve two credits in LEED v4 – v4.1 Interior Lighting category.

E. Solar/PV:

Solar array will be provided to generate renewable energy to support building LEEDs and NET Zero Energy goals. Renewable energy production shall be provided as per LEED v4 – **4.1 BD+C NC E&A Renewable Energy Production** requirements and goals. Preliminary analysis is being shown on

sheet D-E701 for Solar Analysis for more details. Further analysis needs to be done by DBE to calculate exact generation and size. DBE responsibility to find and coordinate with agencies which can help in funding the project. Solar panel efficiency shall be greater than 21%. DBE to use most efficient panels at the time of construction. Warranty shall include material and performance for at least 20 yrs. Electrical equipment shall be rated for solar use and UL listed. All equipment warranty shall be at least for 10 yrs and shall have efficiency of more than 97%. All cables/wiring (PV wire) shall be approved by UL for solar application. DBE responsibility to find and coordinate with agencies which can help in funding the project.

2.6 NEILSON BUILDING-

- A. The electrical service for building will be fed from the new medium voltage distribution system to an outdoor transformer and connect to new 277/480V, 3 phase panel board. Sizing of a new main distribution/service switchboard or panelboard will be determined during the design. Power for 120/208V will be furnished via dry-type distribution transformers to reduce voltage from 480V/ 3 Phase. Renovation of kitchen and mechanical space is being anticipated at this stage. Electrical panels related to this renovation will be replaced together with all wiring and power requirements for equipment. Emergency power will be provided from the existing generator sources for freezer and coolers. LED Lighting and controls will be provided in renovated areas, including egress lighting. Fire alarm devices will be provided where required and will be tied to existing fire alarm panel. See architect sheets for the scope of work.

2.7 SITE LIGHTING -

- A. New LED lighting fixtures will be provided. Lights will be fed from distribution panelboards in nearby building throughout the site as needed. New poles will be provided in new areas. Site lighting shall be provided as per LEED v4 – **4.1 BD+C NC SS Light Pollution Reduction** requirements and goals. DBE to refer to site lighting narrative of landscape consultant for the scope of site lighting. DBE to provide all the material and services needed for complete pole lighting system. New lighting panel will be required in auditorium.

2.8 FIRE ALARM SYSTEMS:

- A. Long Term Care Building:

DBE to provide a new simplex 4100ES addressable fire alarm system per NFPA 72 – National Fire Alarm & Signaling Code and as required by 38CFR – Ch. 1, 59.130 (DVA), 42 CFR 483.90 (CMS) plus state and local regulation. Smoke/CO detection, indication and notification with addressable devices will be provided as per codes and LEED goals. Connect the new fire alarm to existing fire alarm HUB and network. DBE to provide LED indicator above each patient room, annunciator panel at each nurse station. DBE responsibility to provide door holders as per the requirements, coordinate with mechanical and Life safety drawings.

- B. Domiciliary Building:

DBE to provide a new simplex 4100ES addressable fire alarm system per NFPA 72 – National Fire Alarm & Signaling Code and as required by 38CFR – Ch. 1, 59.130 (DVA), 42 CFR 483.90 (CMS) plus state and local regulation. Smoke/CO detection, indication and notification with addressable devices will be provided as per codes. Connect the new fire alarm to existing fire alarm HUB and network.

3. BETTERMENT PLANS:

1.1 WHOLE CAMPUS FIRE ALARM UPGRADE:

DBE to upgrade existing addressable fire alarm system (14) 4010 panels to 4010ES panel. Upgrade existing addressable fire alarm system (6) 4100 panels to 4010ES panel, (10) 4100U panel to 4100ES panel. Upgrade existing addressable fire alarm system (1) 2001 panel to 4007ES panel. 4100U panels can be upgraded to 4100ES by upgrading new motherboard. All the other upgrades will need panel replacement. Upgrade all the fire alarm system to have fiber optic compatibility. New card in each panel will be required to provide optic fiber communication. New computer and new communication card in HUB equipment system will be required for HUB upgradation. Upgrade Fire Alarm systems to comply latest NFPA 72 – National Fire Alarm & Signaling Code and as required by state and local codes and regulations. Note: Some existing buildings may have an addressable fire alarm which should be vetted to confirm the viability of upgrading/expanding system. DBE to make Long term care building as a new HUB by providing new fire alarm system in long term care and domiciliary building and other required equipment. Utilizing existing hub equipment if they are up to date. Connect all the new fire alarm panels to existing fire alarm HUB and network.

1.2 ON-SITE SOLAR PV ARRAY:

DBE to provide solar array to support and exceed net zero goal of DOM. Location for solar PV shall be roofs of Neilson and Lippincott. DBE to provide modifications to roof if needed in order to maximize area for the solar panels. Another location shall be parking lots. DBE to provide proper structure over the parking areas to support solar panels. Ground mounted dual axis solar tracking type panels shall be provided on remote ground. DBE to coordinate with owner for finalizing the locations. DBE responsibility to find and coordinate with agencies which can help in funding the project. As an example preliminary analysis shows approx. 307 sqm area can be covered on Lippincott roof with PV panels. These panels will be able to generate 63,989 KWH/yr or 218,330,468 BTU/yr and will be tied to DOM solar array system. DBE to provide final analysis for size and placement. See architect sheet for location. Solar panel efficiency shall be greater than 21%. DBE to use most efficient panels available at the time of construction. Warranty shall include material and performance for at least 20 yrs. Electrical equipment shall be rated for solar use and UL listed. All equipment warranty shall be at least for 10 yrs and shall have efficiency of more than 97%. All cables/wiring (PV wire) shall be approved by UL for solar application. DBE responsibility to find and coordinate with agencies which can help in funding the project.

SOLAR (LIPPINCOTT)			
TYPE	TOTAL NUMBER	PANEL	AREA SQM
A (4 PANEL FAMILY)	48	4	307.2
B (2 PANEL FAMILY)			0
C (1 PANEL FAMILY)			0
		TOTAL AREA	307.2
		TOTAL KWH/YR	63989
		SYSTEM SIZE KW	48.6
		BTU/YR	218330468
		\$2 COST	97200
		\$3 COST	145800

1.3 WHOLE CAMPUS-WIDE GENERATOR:

DBE to provide and size campus wide generator. Provision to connect generator is being provided in MV switchgear. DBE to size campus wide generator by developing scheme utilizing existing Fifer 125KW generator, new DOM and LTC generator. DBE to pick-up all the loads left by existing and new ATS in these three building and the site loads. Campus wide generator goal can also be achieved by providing larger generator (larger than the size mentioned in dwgs) to pick all the loads in DOM and LTC and then sizing the campus generator excluding the DOM, LTC and Fifer loads. In general, DBE to provide options to owner to cover the entire campus by utilizing DOM, LTC and Fifer generator. A complex scheme of controls will be required to implement the desire design. It would be economical to utilize existing and new generator (DOM and LTC) instead of providing a whole new 4000kw generator. DBE to coordinate with owner for location and size.

1. CODES, REGULATIONS AND GUIDELINES

- 1.1 CDB Design and Construction Manual, including addendums
- 1.2 IDOT Bureau of Design and Environment Manual
- 1.3 IDOT Specifications for Road and Bridge Construction
- 1.4 ISPE Standard Specifications for Water and Sewer Construction in Illinois
- 1.5 Illinois Accessibility Code
- 1.6 Illinois Urban Manual

2. NARRATIVE SUMMARY

2.1 PROJECT DESCRIPTION

- A. The site improvements consist of the renovation and construction of senior residence facilities and associated site development work for those new facilities. The major building structures consist of the replacement of Markword and Fletcher Halls with the construction of a new domiciliary, as well as a new four-story long-term care facility. New utility tunnels and above ground pedestrian link structures will also be constructed to link buildings. Site development includes necessary grading, drainage, utilities, entry plaza(s), hardscape/landscape, parking, and roadway improvements to support the new buildings

2.2 SITE DEVELOPMENT OBJECTIVES

- A. The guiding site development objective shall be to develop a unified campus with improved conditions and functionality for the residents, staff, community, and the surrounding environment.
- B. The grading design of the campus shall provide a usable, well drained site. The overall grading design shall ensure positive drainage away from all structures and shall direct stormwater into the stormwater sewer system. The grading design shall ensure that there is no ponding or standing water in swales, grassed areas, landscaped beds, or paved areas. The grading design for all pedestrian walks and plazas shall provide minimized slopes to provide accessible access with minimal use of steps or ramps while still maintaining adequate drainage.
- C. New development impacts the natural hydrology of a site, both through soil compaction and the addition of impervious surfaces where pervious surfaces existed previously. Stormwater design will address runoff rate and volume to minimize erosion concerns and discharge to natural

drainage paths and the municipal stormwater system, as well as runoff quality to minimize downstream sedimentation, contamination, and flooding.

- D. Demolition and removal of existing sanitary service as well as new service shall be designed to ensure continuous services throughout construction of new facilities. It will also address longstanding maintenance issues through sewer rodding and televising to improve campus wide service.
- E. The design shall facilitate pedestrian access throughout and around the site in a continuous network. There shall be a clear separation between pedestrians and vehicular traffic. Crosswalks shall be provided and clearly delineated wherever walks cross vehicle lanes. All pedestrian walkways that connect Facility building entrances to Accessible parking spaces/transit stops/public sidewalks shall meet the requirements of ADA. All pedestrian drop-off and loading areas shall meet the requirements of ADA.
- F. Public and staff vehicular access throughout the site will be through the main loop road around the campus with minor roadways to leading to the various buildings. The grading design for all public drives and parking areas shall result in minimized slopes to ensure ease with proper drainage. Truck loading areas and docks shall be graded to allow for a level truck to ease in loading/unloading. Lawn and landscaped areas shall not have grades greater than 25% to allow for ease in maintenance. Routes for fire truck access will be designed provide vehicle access to within 300 feet on new buildings with a Bus-40 (Firetruck).

2.3 SITE DEVELOPMENT

A. EARTHWORK

- 1. Site grading is designed to promote the flow of stormwater runoff to the proposed underground storm sewer system with the use of ditches and swales. There is approximately 48' of elevation change between the northeast corner and the high point at the Old Stone Building and 68' of elevation change from the Old Stone Building to the stream on the south side of the property. The change in elevation will require some mass grading of materials onsite to accommodate the construction of new buildings. Slopes and grades will be designed to provide gentle slopes and grades where possible. Retaining walls will be utilized as required.

B. STORMWATER POLLUTION PREVENTION PLAN

- 1. Soil erosion and sediment control will be designed to meet the requirements of the Illinois Urban Manual. A Stormwater Pollution Prevention Plan will be required before construction begins. Best Management Practices will be incorporated within the earthwork design to the extent practical.
- 2. All construction activity and site disturbance should follow the minimum standards set by the Illinois EPA for the Stormwater Pollution Prevention Plan ('SWPPP'). However, as this remains an actively used and operated campus housing our veterans during the construction phase, all construction activity on campus shall be well planned, scheduled and coordinated carefully. Access to

campus and emergency services and utilities need to be operational through the process of construction, and coordinated with the campus leadership and CDB project manager

2.4 STORMWATER MANAGEMENT

- A. The stormwater management system is designed to meet the considerations from the Quincy Storm Water Detention Requirements. The system will convey stormwater from the new buildings and surrounding site improvements through a detention system using Best Management Practices for water quality measures. Per the Quincy Storm Water Detention Requirements, the stormwater leaving the site will have the same intensity as the undeveloped site for the 10-yr 24-hr and 100-yr 24-hr storm events. Detailed designer shall verify design storms correlate to 95th percentile storm required for LEED credits as defined in specification SECTION 018113.14 - SUSTAINABLE DESIGN REQUIREMENTS - LEED® v4 – v4.1 BD+C for Building Design and Construction" New Construction (NC)
- B. The site generally drains in four directions. The north portion drains towards the northern creek, the west portion drains to the City of Quincy storm sewers, the south portion drains to lake Illinois, and the east portion drains towards the 12th street combined sewer. Grate inlets and curb inlets will be used to catch stormwater runoff from vegetated and paved areas, respectively. A series of pipe networks will be used to convey the stormwater to storm trap detention basins (if required) and to existing or proposed outlets.
- C. For the north section, detention will be provided by a storm trap detention basin located underneath the proposed section of parking lot. The west section will drain into a series of bio swales located in the center strip of the proposed parking lot to achieve a portion of the required detention. The overflow for the bioswales will drain into a storm trap located underneath the north portion of the parking lot to provide the additional detention required. The south portion detention requirements will be met by the existing Lake Illinois. The re-developments in the east portion will reduce the amount of detention required to a minimal amount. No additional detention is proposed for the south and east portions.
- D. Runoff was calculated using the SCS runoff equation in Autodesk Storm and Sanitary Analysis 2018. A Curve Number of 61 was used for the pervious areas and 98 was used for all the impervious areas. Weighted curve numbers were used for each sub-catchment. The model also included the existing and proposed pipe networks to determine flow rates to the detention basins and outlets using the kinematic-wave method.
- E. For each drainage area the total volume was calculated under three site conditions, including the proposed conditions, the existing conditions, and the undeveloped conditions. The difference in runoff volume between the proposed conditions and the lesser of either the existing conditions or the undeveloped conditions is assumed to be the required detention volume. The detention volume for the four drainage areas is outlined below:

Drainage Area	Required Detention Volume (ac-ft)
North	3.03
West	1.36
South	0.77
East	0.64

2.5 UTILITIES

- A. Utility services will be provided to meet the demands for domiciliary and new long-term care facility. Where feasible utility corridors shall be established to re-route and consolidate utilities.

3. DETAILS, PRODUCT LISTS OR MATERIALS

A. Sanitary Sewer Material and Pipe Sizing

1. Sewer service size: 6" to 8"
2. Sewer pipe material: PVC. Where required separation from water lines is not possible, use water quality DIP.
3. Joint type: Push-on
4. Existing sewer lines: Relocate where possible and match pipe size and material. Replace with ductile iron pipe where relocation is not possible, and pipe falls within new building footprint.

B. Storm Sewer Material and Pipe Sizes

1. Sewer service size: 12" to 24"
2. Sewer pipe material: RCP or CHDPE, where required separation from water lines is not possible, use water quality DIP.
3. Joint type: Push-on
4. Existing sewer lines: Relocate where possible and match pipe size and material.

C. Stormwater Features

1. Permeable pavers
2. Bioretention/Rain Gardens
3. Underground stormwater detention shall be used to regulate the flow of stormwater and will be utilized to handle large impervious areas such as roads and parking lots. They are designed to restrict the discharge rate of stormwater runoff by providing large-volume storage and incorporating an impermeable liner to prevent infiltration.
4. Flow spreaders and riprap outfalls to be provided at all discharge points to the natural environment.

D. Roads, Parking, and Sidewalk Cross-Sections

1. Main Loop Road

- a. The main loop road shall be designed to accommodate the largest anticipated vehicle accessing the site. The roads will be designed to accommodate the maximum weight and turning abilities of the design vehicles.
- b. Design vehicle: WB-55 truck
- c. Alternate design vehicle (perimeter access): Bus-40 (Firetruck)
- d. Typical new road section: Concrete pavement, aggregate base, aggregate shoulders or curb and gutter as needed (pavement thickness will be determined based on recommendations of Geotech report)
- e. Minimum roadway width: 24'

2. Internal Access Road

- a. The internal access roads will be designed to accommodate access to buildings
- b. Minimum external access road width: 20'
- c. Typical external access road section: Concrete pavement, aggregate base

3. Existing Roads

- a. The existing roads will be re-surfaced
- b. Mill and overlay
- c. Remove 2" existing asphalt and replace in kind
- d. Construction access roads remove full asphalt section to aggregate base

4. Sidewalks/Emergency Vehicle Access Roads

- a. Two 14' wide dual-purpose sidewalks will be installed that will also be designed for emergency vehicle access. See drawing S-C301 Emergency and Large Vehicle – Exhibit for location. Pavement section shall be same as main loop road, finish per landscape plans.

5. Pedestrian Access

- a. Interior sidewalks shall be designed to meet ADA/PROWAG guidelines.
- b. Typical sidewalk section: Portland cement concrete, aggregate base
- c. Minimum sidewalk width: 7', 12' wide sidewalks will be used to in high traffic areas to provide access for pedestrians and vehicles.

6. Parking Lot Expansion

- a. The parking lot expansion will accommodate additional parking required for the new buildings and make up for the loss of parking from redevelopment.
- b. Typical parking space size: 18' x 9', 90-degree orientation
- c. Typical aisle width: 24'

- d. Typical pavement section: Hot-mix asphalt pavement, aggregate base (pavement thickness will be determined based on recommendations of Geotech report)
- e. Edge treatment: No curb, wheel stops required at exterior parking spaces
- f. Total parking spaces provided: 683 (365 Existing/318 New)

OUTLINE SPECIFICATIONS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.
 - 1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
 - 2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

END OF DOCUMENT 003132

DIVISION 01 – GENERAL REQUIREMENTS

015150 Use of Existing Facilities

1.1 REQUIREMENTS INCLUDE Contractor provide:

- A. Scheduling
- B. Security and site regulations
- C. Entrances
- D. Construction aids
- E. Temporary enclosures and barriers
- F. Fences
- G. Temporary utilities

- H. Access roads & parking areas
- I. Traffic regulation
- J. Construction Cleaning
- K. Field Offices
- L. Storage
- M. Close-out

2.1 ENTRANCES

- A. Using Agency and/or CDB may elect to specify any entrances to the site or buildings that may be restricted for construction use. Subject to position and timing of such entrances, additional entrances, or additional restrictions may be applied to Contractor's entrances for personnel or Contractor's vehicle access may be imposed.
- B. For vehicular entrances and access to public roadways, Contractors shall make provision for flagman personnel at times when vehicles services the site are prominent. In the event of traffic congestion, disruptions or safety concerns, CDB may elect to require additional duration and times for flagman presence, at no additional cost. All ,vehicles entering the roadway must do so in a safe and controlled manner without endangering the public or other Using Agency activity and use of the roadway.

3.1 ACCESS ROADS & PARKING AREAS

- A. Designated existing on-site streets and driveways may be used for construction traffic access and not for internal site construction circulation. Maintain existing condition, repair to as new condition all affected on-site and public roadways based on condition of roadway as documented by the Contractor prior to start of construction. Provide photographic documentation before and after use to CDB..
- B. The use of existing on-site streets, driveways or walks for construction traffic, or by construction personnel, will not be permitted.
- C. Use of existing parking facilities for construction personnel or for contractor's vehicles or equipment will not be permitted.
- D. Maintain perimeter public roads, pubic walks and existing public landscaped areas in a sound, clean condition. Restore to original condition upon work completion prior to Final Acceptance.
- E. Maintain existing on-site landscaped areas within the construction site, including regular and period lawn moving and, edging and fence lines in a neat condition, acceptable to the Using Agency for safety and appearance purposes. Review maintenance program with CDB for approval.
- F. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Using Agency's operations or construction operations.

4.1 TRAFFIC REGULATION

- A. Contractor provide traffic control and directional signs, mounted on barricades or standard posts:
- B. At each change of direction of a roadway and at parking areas.
- C. Provide qualified and suitably equipped flaggers when construction operations encroach on traffic lanes, as required for traffic regulation.

015500 Access Roads, Parking Areas & Parking Control

1.1 GENERAL

- A. Contractor:
 - 1. Provide and maintain vehicular access to site and within site.
 - 2. Remove temporary equipment and facilities when no longer required.
 - 3. Restore grounds to specified conditions.

2.1 ROADS AND PARKING AREAS

- A. Construct and maintain roads, drives, walks and parking facilities to provide uninterrupted access to construction offices, mobilization, work, storage areas and other areas indicated on the drawings for execution of the Contract.
 - 1. Location: Where shown on drawings, as approved by the CDB and Using Agency.
 - 2. Size of parking facilities: Adequate to provide for personnel needs of all contractors.
- B. Provide access for emergency vehicles. Maintain driveways a minimum of 15 feet wide between and around combustible materials in storage and mobilization areas.
- C. Keep fire hydrants and water control valves free from obstruction or damage and accessible for use.
- D. Additional access roads other than provided herein, requested by any Contractor shall be at the requesting Contractor's expense and approved by the CDB. Removal and restoration of the area to specified condition shall also be at Contractor's expense.

3.1 TRAFFIC CONTROL

- A. Provide and operate traffic control and directional signals in all areas under Coordinating Contractor's control.
- B. Provide traffic control in accord with appropriate articles in the IDOT Standard Specifications for Road and Bridge Construction, Section 700, and National Manual on Uniform Traffic Control Devices including the Illinois Supplement.
- C. Construction Parking Control. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, using agency's operations or other construction operations.

015723 Temporary Storm Water Pollution Control

All construction activity and site disturbance should follow the minimum standards set by the Illinois EPA for the Stormwater Pollution Prevention Plan ('SWPPP'). However, as this remains an actively used and operated campus housing our veterans during the construction phase, all construction activity on campus shall be well planned, scheduled and coordinated carefully. Access to campus and emergency services and utilities need to be operational through the process of construction, and coordinated with the campus leadership and CDB project manager.

1.2 RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

- A. Section Includes:
 - 1. Temporary stormwater pollution controls.

1.4 STORMWATER POLLUTION PREVENTION PLAN

- A. The Stormwater Pollution Prevention Plan (SWPPP) is part of the Contract Documents and is bound into this Project Manual.

1.5 PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a conference.

- A. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.
 - 1. Meet with Owner, Architect,[Construction Manager,] and earthwork subcontractor.
 - 2. Review requirements of the SWPPP, including permitting process, worker training, and inspection and maintenance requirements.

PART 2 - EXECUTION

2.1 INSTALLATION

- A. Comply with all best management practices, general requirements, performance requirements, reporting requirements, and all other requirements included in the SWPPP.
- B. Locate stormwater pollution controls in accordance with the SWPPP.
- C. Conduct construction as required to comply with the SWPPP and that minimize possible contamination or pollution or other undesirable effects.
 - 1. Inspect, repair, and maintain SWPPP controls during construction.
 - a. Inspect all SWPPP controls not less than every seven days, and after each occurrence of a storm event, as outlined in the SWPPP.
- D. Remove SWPPP controls at completion of construction and restore and stabilize areas disturbed during construction.

END OF SECTION 015723

DIVISION 31 – EARTHWORK

311000 Site Clearing

SECTION 311000 - SITE CLEARING

1.1 SUMMARY

- A. Protecting existing vegetation to remain.
- B. Removing existing vegetation.
- C. Clearing and grubbing obstructions, trees, shrubs, and other vegetation, including grinding stumps and removing roots and debris.
 - 1. Chipping removed tree branches and disposing of off-site.
- D. Stripping and stockpiling topsoil and disposing of surplus topsoil.
- E. Removing existing above- and below-grade site improvements.
- F. Disconnecting, capping or sealing, and removing site utilities.
- G. Providing temporary erosion- and sedimentation-control measures.

END OF SECTION 311000

Section 312000 – Earth Moving

1.1 SUMMARY

- A. Rough grading the Site
- B. Excavating and backfilling for buildings and structures
- C. Excavating and backfilling for utilities

1.2 MATERIALS

A. Soil Materials: Satisfactory and unsatisfactory soil classifications, subbase material, base course, engineered fill, bedding course, leveling base, drainage fill and non-reinforced soil fill.

B. Materials shall meet the requirements of the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

1.3 EXCAVATION

A. Explosives: Not allowed

B. Excavation, backfill and compaction shall meet the requirements of the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

C. Disposal of Surplus and Waste Materials: waste materials and unsatisfactory soil off Owner's property

1.4 FIELD QUALITY CONTROL

A. Testing Agency: Design Builder engaged

END OF SECTION 312000

DIVISION 32 – EXTERIOR IMPROVEMENTS

321216 Asphalt Paving

1.1 QUALITY ASSURANCE

A. Regulatory Requirements: Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction.

1.2 MATERIALS

A. Asphalt Materials:

1. Asphalt Binder: AASHTO M 320, performance graded.

2. Prime Coat: Asphalt emulsion.

3. Tack Coat: Emulsified asphalt.

4. Fog Seal: Emulsified asphalt.

B. Auxiliary Materials:

1. Recycled Materials: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base

material; and recycled asphalt shingles.

2. Herbicide.

C. Asphalt Mixes: Approved by authorities having jurisdiction.

1. Base Course: HMA Binder IL-19mm.

2. Surface Course: HMA Surface Course, Mix "D", N50.

D. Emulsified-Asphalt Slurry: ASTM D 3910, Type 1

E. Materials shall meet the requirements of the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

1.3 INSTALLATION

A. Hot-Mix Asphalt Paving:

1. Subgrade proof rolled.

2. Herbicide applied.

3. Prime coat over unbound-aggregate base course.

4. Base Course: See Geotech Report.

5. Surface Course: See Geotech Report.

B. Installation shall meet the requirements of the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

1.4 FIELD QUALITY CONTROL

A. Testing Agency: Design Builder engaged.

END OF SECTION 321216

321313 Concrete Paving

1.1 QUALITY ASSURANCE

A. Mockups to demonstrate surface finish, texture, and color; curing; and standard of workmanship.

1.2 PRODUCTS

A. All products shall meet the requirements of the IDOT Standards Specifications for Road and Bridge Construction, latest edition.

B. Concrete, General: ACI 301.

C. Reinforcement:

1. Reinforcing Bars: deformed steel.

2. Joint Dowel Bars: plain steel.

D. Concrete:

1. Portland Cement: Gray

2. Fly ash.

3. Normal-weight aggregate.

4. Air-entraining admixture.

5. Compressive Strength: 3500 psi at 14 days.

E. Detectable Warnings: Blockouts in concrete for detectable paving units.

1.3 PREPARATION

1. Grading, sub-base preparation and base course shall meet the requirements of the IDOT Standards for Road and Bridge Construction, latest edition.

1.4 FINISHING AND CURING

A. Finishes: Artificial turf drag.

B. Cure concrete by moisture curing, moisture-retaining-cover curing or a combination of these.

C. Finishing and curing shall meet the requirements of the IDOT Standards for Road and Bridge

Construction, latest edition.

1.5 FIELD QUALITY CONTROL

A. Testing: Design Builder engaged.

END OF SECTION 321313

321316 Decorative Concrete Paving

321723 Parking Bumpers

SECTION 321713 - PARKING BUMPERS

1.1 SUMMARY

A. Concrete wheel stops.

1.2 INSTALLATION

A. Wheel stops anchored with galvanized-steel hardware.

END OF SECTION 321713

321723 Pavement Markings

321723 – PAVEMENT MARKINGS

1. The paint shall meet the specifications set forth in Section 920 of the 2003 MDOT Standard Specifications for Construction, unless otherwise indicated on the drawings.
2. Color shall be as Specified on the Plans or as follows:
 - a. Item Color Width
 - b. Stop Bars White 12 inches
 - c. Traffic Lanes Yellow 4 inches
 - d. Bus Lanes White 4 inches
 - e. Standard Parking Stalls Yellow 4 inches
 - f. Barrier Free Parking Stalls Blue 4 inches
 - g. No Parking Areas Yellow 6 inches
 - h. Barrier Free Access Areas Blue 4 inches
 - i. Curbs As noted Full Face

DIVISION 33 – SITE UTILITIES

330500 Common Work Results for Utilities

SECTION 334200 - STORMWATER CONVEYANCE

1.1 PIPING

- A. Concrete Pipe and Fittings: Corrugate High-Density Polyethylene pipe and fittings
- B. Piping shall meet the requirements of the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

1.2 COMPONENTS

- A. Cleanouts: Plastic.
- B. Drains: Cast iron area and cast-iron trench
- C. Manholes: Standard precast concrete.
 1. Adjusting rings.
 2. Ductile-iron manhole frames and covers.
- D. Drainage Specialties: Oil interceptors and sediment interceptors.
- E. Catch Basins: Standard precast concrete.
 1. Ductile-iron frames and grates.
- F. Stormwater Detention Structures: Underground stormwater detention features
- G. Pipe Outlets: Head wall, riprap basins, filter stone and energy dissipaters.
- H. Components shall meet the requirements of the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

END OF SECTION 334200

7.

RE: Bridging Narrative – Illinois Veterans Home Quincy

New LTC Building

East and West Healing Garden, Drop Off Area, Resident Garden Plots

Metal security fence – 6' ht steel picket fence with manufacturer warranty finish of 20 years min. Picket ¾" sq 18 ga.. Posts 2.5" sq 16 ga. With ball cap, 3-rails 1.5" sq. 14 ga. Provide 3' wide gate with time delayed egress hardware and signage.

Concrete patio – standard color or warm colored integral colored concrete, 5" thick on 4" compacted gravel, medium broom finish, saw cut control joints, caulked expansion joints.

Synthetic turf – two tone tufted polyethylene pile turf and thatch layer, 54 oz material face weight, 1.5" pile height with perforated polyurethane backing, no infill materials set on 2" of 3/8" stone chip over 4" open graded compacted gravel

Shade structure – painted tube steel post and beams with 50% perforated aluminum metal panel flat top. Posts anchored to frost footing with expansion anchors. Beams connect to posts with mechanical connections. Use intermediate tube steel joist for metal panel support.

Cantilevered Shade trellis – painted tube steel posts and beams with 2 x lpe wood joist shade slats. Posts anchored to frost footing with expansion anchors.

Site furniture – Benches, tables and chairs, see specs.

Focal Garden Feature – Garden ornament from art program

Plants – combination of 3" caliper shade trees, 6' ht ornamental flowering trees, 6' ht evergreen trees, 24" ht evergreen and deciduous shrubs, groundcover and perennial beds.

Irrigation – provide at least two hose bib connections on adjacent building perimeter per garden or drop off area. Provide yard hydrant at Resident Garden Plots.

Resident gardens – accessible raised garden beds 42" x 42" x 36" height made of lpe wood surrounded by concrete walk. Provide compost container, 4' x 8' storage shed for tools and watering containers and hoses, two benches, two upright planters, and yard hydrant with hose reel.

Pedestrian Lighting – provide 3000K LED down lights in shade structures and trellis. Conceal conduit in posts/beams. Recess junction boxes in tube steel. Photocell on timer off. In garden areas provide path lights at key spaces (seating areas, entries or walk intersections) with downward directing LED in less than 24" ht fixture. At drop off use commercial 36" ht. round bollard along walks not illuminated by canopy lighting.

Site (Campus Green)

Vehicular concrete paving – warm colored integral color, 8" thick reinforced concrete on 10" compacted gravel, medium broom finish, saw cut control joints, caulked expansion joints.

Artificial turf putting green – fringe perimeter to be two tone tufted polyethylene pile turf and thatch layer, 54 oz material face weight, 1.5" pile height with perforated polyurethane backing, no infill materials, putting turf to be

48 oz face weight, two toned 3/8" pile height tufted polyethylene turf set on 2" of 3/8" clean stone chip over 4" open graded compacted gravel

Amphitheater seating with shelter – audience seating 18" exposed ht x 16" wide cast in place concrete curb with rubbed finish. Stage paving to be standard concrete paving. Shelter – provide 40' wide acoustical bandshell, high pitch, half hexagon wood shelter for outdoor use. Treated gluelam wood trusses, composite shingle roof, 30 PSF snow load, 120 MPH wind load, Provide electrical control center in rear of bandshell adequate for outdoor performances.

Relocated Vietnam Memorial – disassemble and reassemble granite memorial, flag poles, lights and granite benches. Set memorial on frost footed concrete base surround by pedestrian walk.

Relocated WWII Memorial – disassemble and reassemble memorial, memorial sign, benches and lights. Set memorial on frost footed concrete base surround by pedestrian walk.

Relocated Combat Wounded Veterans Memorial – relocate granite memorial on new frost footed base raised 12" above grade.

Relocated Korean War Memorial - relocate granite memorial on new frost footed base raised 6" above grade. Relocate flood lights and benches associated with memorial.

Relocated Iraqi War Memorial – relocate concrete memorial on new frost footed base flush with grade.

New flagpole - 50' ht. tapered pole satin aluminum finish with internal wire halyard and lockable flush mounted door, winch and winch handle and gold anodized finial ball. Provide external spot lighting of flag.

Other miscellaneous items

cannon relocations – relocate 4 existing cannons by the Old Stone building to locations shown on drawings. Install on new cast in place frost footings flush with grade.

Misc. stone boulder memorials or small bronze memorial plaques – relocate as directed by architect in Campus green area.

New Domiciliary

Dinning terrace – concrete walk paving with sawcut control joints. The terrace abuts a low cast in place retaining wall to transition the grade and to protect existing tree roots. A 42" ht metal pick guard rail will surround the adjacent grade transitions on top of the wall. Tables and chairs will occupy the terrace.

Colored Concrete – warm colored integral colored concrete, 5" thick on 4" compacted gravel, medium broom finish, saw cut control joints, caulked expansion joints.

Masonry seatwall - 18" ht. by 16" wide frost footed seatwall. Brick masonry veneer to match building with limestone appearing precast cap.

Outdoor fitness station –roofed freestanding exercise and fitness station with three activity panels surface mounted on concrete slab. Include welcome sign, instructions, lower body cycling exercises and PNF exercises.

Retaining wall – decorative engineered unit wall system is a series of stepped terraces. Shape, color and texture of wall system to be complementary to building masonry.

Roadway, drives and parking lot lighting

Lighting for roads, drives and parking lots will be done with two different styles of light fixtures. Areas of importance or prominence such as main entry drives or near building entries will have a decorative looking fixture to enhance the appearance. See plan for general locations. Other areas like remote parking lots or drives will have a generic functional fixture of similar pole color and characteristics.

Decorative roadway light – 20' round pole height, house side shields on fixtures adjacent to buildings, 4000K LED color temperature, dark bronze fixture and pole finish, simple straight arm bracket for one or two fixtures per pole.

<https://www.lumenpulse.com/en/products/1755/allegra-medium>

<https://www.signify.com/en-us/products/outdoor-luminaires/road-and-urban-lighting/urban/pendants/domus-led-pendant-small-dos>

https://www.sternberglighting.com/assets/1/7/1527_OMEGA_SPEC.pdf?GUID=e066f4c19dc14bab9413854516c4d1f9

Roadway and Parking lot light – 20' round pole height, house side shields on fixtures adjacent to buildings, 4000K LED color temperature, dark bronze fixture and pole finish, simple straight arm bracket for one or two fixtures per pole.

<https://www.acuitybrands.com/products/detail/209326/lithonia-lighting/d-series-area-size-1/dsx1-led-area-luminaire>

Pedestrian Lighting

Pedestrian lighting will be done with three different levels and type of fixtures. General pathway lighting will be lit with decorative pole fixtures to match the decorative road fixtures. In areas close to building or building entries where the pole fixture is too close use a bollard style fixture. And finally, in the LTC and Domiciliary gardens use a garden path light for a discrete level of lighting.

General path light - 10' round pole height, house side shields on fixtures adjacent to buildings, 4000K LED color temperature, dark bronze fixture and pole finish, simple straight arm bracket for one or two fixtures per pole.

<https://www.lumenpulse.com/en/products/1755/allegra-medium>

<https://www.signify.com/en-us/products/outdoor-luminaires/road-and-urban-lighting/urban/pendants/domus-led-pendant-small-dos>

https://www.sternberglighting.com/assets/1/7/1527_OMEGA_SPEC.pdf?GUID=e066f4c19dc14bab9413854516c4d1f9

Bollard light +- 36" ht bollard with downward glare free illumination to reduce glare, 4000K color temperature, dark bronze finish mounted on small concrete footing.

<https://www.bega-us.com/groupdetail.aspx?groupid=137221&familyid=21>

Garden Path Light – in the LTC and Domiciliary garden areas use bollard height fixture shorter than the pedestrian bollard (27”) to illuminate the key egress routes to a common area and other desirable common patio areas. 4000K color temperature, dark bronze finish mounted on small concrete footing.

<https://www.bega-us.com/groupdetail.aspx?groupid=137218&familyid=34>

Garden trellis down light – in the LTC, use a down light top of the metal trellis to illuminate the use areas under the metal trellises. Conceal conduit and junction boxes in support structure. 4000K color temperature, dark bronze finish mounted on small concrete footing.

<https://www.bega-us.com/productdetail.aspx?groupid=136972&itemid=6901&familyid=19>

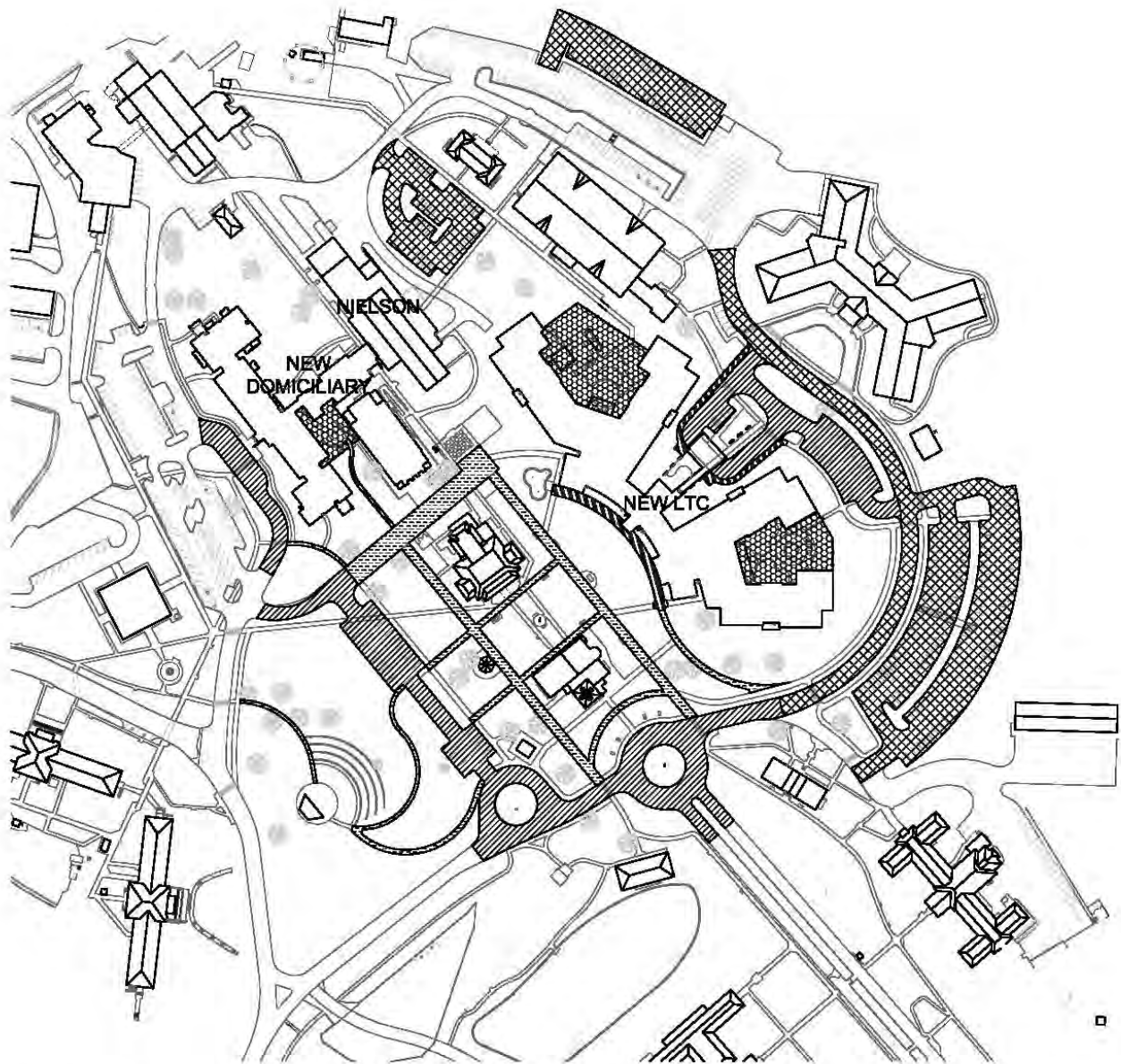
Misc. outdoor lighting

Flagpole light – illuminate flagpole with LED spotlight, 4000K color temperature, dark bronze fixture color mounted on small concrete footing.

<https://www.bega-us.com/productdetail.aspx?groupid=127680&itemid=7280&familyid=20>

Memorial lighting – illuminate relocated memorials with new LED floodlights, 4000K color temperature, dark bronze fixture color mounted on small concrete footing.

<https://www.bega-us.com/productdetail.aspx?groupid=127680&itemid=6685&familyid=20>



Legend:

-  Decorative Roadway/Parking Lot
-  Decorative Pedestrian Path Light
-  Roadway/Parking Lot
-  Bollard Light
-  Garden Path Light



LANDSCAPE OUTLINE SPECIFICATIONS – HITCHCOCK DESIGN GROUP

RE: Outline Specifications – Illinois Veterans Home Quincy

061000 – ROUGH CARPENTRY

1. Upright Planter structure to be of rough sawn cedar
2. Provide complete shop drawing for review and approval
3. Provide stainless steel or hot-dipped galvanized fasteners and anchorages.
4. Set structure to required levels and lines, with members plumb, true to line, cut, and fitted.
5. Below grade waterproofing: Cold applied asphaltic waterproofing, viscosity as recommended by manufacturer for application.

321316 – DECORATIVE CONCRETE PAVING

1. 5" concrete over 4" compacted granular base, over compacted subgrade
2. Compressive strength (28 days) 3000 psi
3. Finish: Medium broom finish
4. Joints: Saw-cut control joints $\frac{1}{3}$ the thickness of the slab; expansion joints (full depth) to have joint filler with joint sealant.
5. Color pigment (alternative): earth tone selected from manufacturer's standard colors. Provide 3'x3' mockup for approval.
6. Planter curbs to be 6" height, 6" wide, with rubbed finish and chamfered edge.

321813 – SYNTHETIC GRASS SURFACING

1. Surfacing to consist of UV resistant synthetic yards bound to water-permeable backing and appropriate infill.
2. Install with 4-6 lbs/sq. ft. of rounded silica sand infill.
3. Putting fabric installed over 1"-2" of $\frac{1}{4}$ " minus screenings, over 4" crushed stone base, over compacted subgrade.

323119 – DECORATIVE METAL FENCES AND GATES

Furnish and install decorative metal fences to enclose courtyard healing gardens.

1. Fence, 6' height, steel
Options: 3 rail panel, black color, rackable
2. Gate, 6' height to match fence panel.

329113 – SOIL PREPARATION

Furnish and place 12" of planting soil in landscape beds and 6" topsoil in lawn areas. Conduct soil test and supplement planting soil as required. Planting soil shall be two thirds topsoil and one third mulch and soil conditioner.

1. Topsoil
 - a. Provide imported topsoil of sandy loam, uniform in color and texture, corresponding to native soils, containing no grass roots, weeds, rocks, stiff clay, clods, or other substance

LANDSCAPE OUTLINE SPECIFICATIONS – HITCHCOCK DESIGN GROUP

undesirable to plant growth. Soil shall be loose, friable, and of good tilth. The pH shall range between 5.5 to 6.5.

- b. Nutrient data as follows. All soil sampling and testing shall comply with procedures in the USA Ag. Handbook 60: Diagnosis and Improvement of Saline and Alkali Soils.

Phosphorus	Min. 75 lbs / ac
Potassium	Min. 300 lbs / ac
Calcium	Min 1500 ppm
Cation Exchange Capacity	Min 20mea / 100g
Soluble Salt	Max 1000 ppm

- c. Organic content shall not be less than 3 percent and not great than 5 percent determined by loss of ignition.

- d. Gradation:

<u>Sieve Designation</u>	<u>Percent Passing</u>
No. 4 (4.76 mm)	100
No. 10 (2.00 mm)	95-100
No. 18 (1.00 mm)	90-100
No. 35 (500 micron)	65-100
No. 60 (250 micron)	0-50
No. 140 (105 micron)	0-20
No. 270 (53 micron)	0-10

- e. Textural Grades:

Fine gravel, coarse sand, medium sand	20-40%
Silt	25-60%
Clay (Bouyoucous hydrometer test)	5-20%

- f. Sand shall be clean, sharp, coarse sand passing ¼" mesh screen and free of foreign and organic matter. The pH shall range between 5.5 and 6.5.

329200 – TURF AND GRASSES

1. Install erosion control blanket per manufacturer's recommendations.
2. Apply growth fertilizer 3 weeks after seeding at 5 lbs/1000 sf
3. Apply maintenance fertilizer 30 days after applying growth fertilizer at 3 lbs/1000 sf.
4. Where turf abuts a planting bed not defined by a hard edge, contractor to establish and maintain a spade edge.

329300 – PLANTS

All plant material shall be grown and sourced within 150 miles of the project site and shall comply to ANSI Z60.1

1. Trees: 3" caliper (min), balled and burlapped.
2. Ornamental Trees: 6' height (min.) multi-stem, balled and burlapped.
3. Evergreen Trees: 6' height (min.), balled and burlapped.
4. Understory Planting: a combination of shrubs (24"-36" height balled and burlapped or container grown), perennials (1 gallon container), grasses (1 gallon container) and groundcovers (3" pot). Understory planting areas to be 80% shrubs and 20% perennials, grasses, and groundcover.
5. Hardwood bark mulch, 3" layer.
6. Plant warranty period for one year from Substantial Completion, plus one growing year.

LANDSCAPE OUTLINE SPECIFICATIONS – HITCHCOCK DESIGN GROUP

Preliminary site Phase I and Phase II Environmental Studies and Geotechnical Analysis

Phase I and Phase II Environmental Site Assessments (ESAs) and a Geotechnical analysis were conducted to help in an overall general assessment of the site. The reports appended to the Bridging Documents are intended to help generate a high-level overview of the nature of the site and conditions within. Numerous Recognized Environmental Conditions (RECs) were documented as part of the Phase I ESA and will need to be addressed for handling, assessment and remediation as part of construction following all applicable laws and codes.

The number of soil borings and soil samples collected as part of the geotechnical analysis and the Phase II ESA were determined to give the widest possible investigation over the Campus and they were conducted in areas where construction was determined to be taking place, based upon information provided by the design teams assembling the Bridging Documents.

The geotechnical and environmental analysis are intended to help the potential DB teams in their initial assessments. However, as the DB team are granted flexibility in site routing of utilities and location of buildings, they are expected to conduct their own investigations under the final decided footprints and utility layouts if they are different from the locations investigated in the geotechnical investigation and the Phase II ESA. Minimum requirements are established in the CDB's Design and Construction manual, current edition.

The Design-Builder's (DB's) further investigations are expected to be guided by plan design, areas and depths of impact on site for both site-civil, landscape, building, utility, demolition and other related activity like construction material staging, construction traffic activity and such that are needed for a full and complete execution of the project. Both geotechnical and environmental sampling were conducted in areas accessible at the time of the investigation. Additional geotechnical and environmental sampling should be conducted by the DB teams, as necessary, under the footprints of buildings after demolition activity is complete to further characterize and evaluate the subsurface material present at the Campus. These samplings would include, but not be limited to, geotechnical and environmental sampling. Additionally, soil gas sampling should be conducted as part of any additional environmental investigation in areas which would be under any proposed building foundations. It would be the responsibility of the DB teams to prepare any and all reports needed to document these additional investigations and submit them to the State CDB.

Special note on buried unmapped, underground utilities: While the campus has access to some level of mapped underground utilities, it is expected that these are not comprehensive and accurate enough for

construction activity. Special care needs to be exercised in arranging for a utility locating and mapping exercise prior to construction activity and associated environmental requirements.

Soil handling and disposal and/or reuse shall be conducted in accordance with all appropriate Illinois Environmental Protection Agency (IEPA) standards and regulations. Careful records shall be maintained of all activity and submitted to the State CDB in paper and electronic formats at the end of the process, and prior to billing. Progress of paperwork is expected to be documented prior to 50% milestone billings for such environmental activity.

SECTION 017419 – CONSTRUCTION WASTE PLANNING, MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, 01 8113.14 Sustainable Design Requirements, and other Division 01 Specification Sections, apply to this Section. This may include:
- 1). 02 4116 FL - STRUCTURE DEMOLITION
 - 2). 02 4119 FL - SELECTIVE DEMOLITION

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
- 1). Construction and Demolition Waste Management Planning
 - 2). Divert nonhazardous demolition and construction waste from landfill and incineration.
 - 3). Salvaging nonhazardous demolition and construction waste.
 - 4). Deconstruction due diligence and implementation.
 - 5). Recycling nonhazardous demolition and construction waste.
 - 6). Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
- 1). Section 04 20 00 "Unit Masonry" for disposal requirements for masonry waste.
 - 2). Section 04 43 13.13 "Anchored Stone Masonry Veneer" for disposal requirements for excess stone and stone waste.
 - 3). Section 04 43 13.16 "Adhered Stone Masonry Veneer" for disposal requirements for excess stone and stone waste.
 - 4). Section 31 10 00 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

Retain terms that remain after this Section as they may have been edited for a project. Definitions that are a part of "LEED® v4.1 for Building Design and Construction" (BD+C) New Construction (NC) apply to this Section and other sections.

- 1). LEED® BD+C: Rating System Set: USGBC's "LEED v4.1 for and Building Design and Construction." Definitions that are part of this document and [Divisions 3-10, 32, 33] apply to this Section.
- A. Alternative Daily Cover (ADC): **Material other than earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging. Generally these materials must be processed so they do not allow gaps in the exposed landfill face**
- B. Certified Commingled Recycling Facility: **A construction waste processing facility third-party certified to properly manage and measure commingled and single waste streams. The Recycling Certification**

Institute (RCI) (<https://www.recyclingcertification.org/certified-facilities/>) or other approved third-party certification body may qualify as Certified Commingled Recycling Facility.

- C. **Clean Waste:** Nonhazardous materials left over from construction and demolition. Clean waste excludes lead and asbestos.
- D. **Commingled Waste:** Building waste streams that are combined on the project site and hauled away for sorting into recyclable streams. Also known as single-stream recycling
- E. **Construction Waste:** Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- F. **Deconstruction:** The selective, methodical dismantlement of a built environment - building, or site in whole or in-part as a waste management planning strategy. The harvest of materials and/or architectural elements and/or building systems that may be re-used, repurposed, recycled, salvaged, and/or hold financial or historical value.
 - 1). **Federal Definition: Deconstruction** is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials, so that they may be reused or recycled. It should be considered when adaptive reuse of a building is not an option, and may be used in conjunction with demolition. Deconstruction minimizes demolition landfill materials and reduces material costs for the converted facility. Diverting demolition waste from the landfill contributes to meeting Federal requirements for waste diversion. (USACE / NAVFAC / AFCEC / NASA UFGS - 02 41 00 February 2019)
- G. **Demolition Waste:** Building, structure, and site improvement materials resulting from demolition operations.
- H. **Disposal:** Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on User Agency's property.
- I. **Diversions Waste:** Any safe, regulation, and code compliant means of keeping demolition, construction, commercial, healthcare, industrial, consumer, household, solid wastes from entering landfills or being incinerated. Methods include: Recycling, reusing, repurposing, donating, and salvaging.
- J. **Electronic Waste (E-Waste):** Discarded portable devices (mobile phones, electronic tablets, headphones), office and consumer equipment (computers, monitors, copiers, printers, mice, scanners, fax machines), appliances (refrigerators, dishwashers, water coolers), external power adapters, and televisions and other audiovisual equipment.
- K. **Hazardous Waste:** Wastes identified by the Resource Conservation and Recovery Act (RCRA) as hazardous if it is ignitable, corrosive, reactive, and/or toxic and/or is listed as hazardous (40 CFR 261 Subparts C and D)
 - a. **A Solid waste material, product, system, chemical, liquid, sludge, solid gas, substance that can be considered dangerous, harmful, toxic to human beings and the natural environment. Hazardous waste streams include but are not limited to:**
 - 1). **PBTs (Persistent Bioaccumulative Toxins):** Chemicals and neurotoxins which break down extremely slowly in the environment, accumulate within animal tissues in increasing concentrations up the food chain, remain in the environment for long periods of time, and are not readily destroyed, (Mercury, Polychlorinated biphenyls (PCBs), Hexachlorobenzene (HCB), etc.) <https://www.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-rules-under-tri>
 - 2). Petroleum based products
 - 3). Pesticides
 - 4). Chemicals
 - 5). Herbicides
 - 6). Batteries – ALL Primary and Secondary: Stand-alone Batteries and those found sealed within Electronic Components and Hand-held Devices; Rechargeable and Non-rechargeable. Including but not limited to:

Coin - Button Type: (Mercury - Silver Oxide, Zinc Air) Watches, Medical Devices, hearing aides, toys, computer time keeping (found on motherboards), cameras,

Automotive: Lead-acid, Lead-acid Gel, Sealed Lead-acid (VRLA), Hybrid Automotive.

Power Tools: Lithium-ion (Li-on), Nickel-Cadmium (NiCd), Nickel Metal Hydride

Consumer - Household: Alkaline, Lithium. (AAA, AA, C, D, 9-Volt)

Mobile – Portable Devices: Mobile phones, smart phones, tablet devices, laptop computers, measuring instruments.

- 7). Mercury Containing Lamps
 - 8). Electronic Waste (e-Waste) including Cathode Ray Tubes (CTR Televisions – Computer Monitors)
 - 9). Medical Waste
 - 10). Cleaning Products
 - 11). Paints, sealants, adhesives, coatings.
- L. Integrated Project Delivery: **An approach that involves people, systems, and business structures (contractual and legal agreements) and practices. The process harnesses the talents and insights of all participants to improve results, increase value to the User Agency, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction. (Adapted from American Institute of Architects)**
- M. Land-clearing Debris and Soil: **materials that are natural (e.g., rock, soil, stone, vegetation). Materials that are manmade(e.g., concrete, brick, cement) are considered construction waste even if they were on site.**
- D. **LEED®:** Leadership in Energy and Environmental Design: A series of more than 25 Internationally recognized performance green building rating systems comprised of 7 rating system sets authored by the U.S. Green Building Council headquartered in Washington D.C.. Rating system sets include: Building Design and Construction (BD+C), Interior Design and Construction (ID+C), Existing Building Maintenance and Operations (EBOM), Neighborhood Development (ND), Residential (Homes), Transit Stations, and Cities.
1. LEED provides a rigorous and obtainable framework for identifying and implementing practical, measurable performance green building design, construction, operations and maintenance solutions focused on, Location and Transportation, Sustainable Sites, Water Efficiency, Energy Efficiency, Materials and Resources, Indoor Environmental Quality, and Innovation.
- N. **LEED Accredited Professional:** (LEED AP®) Dedicated technical experts to ensure building certification meets the highest levels of quality, rigor, and integrity.
- O. **LEED Green Associate:** A foundational professional credential signifying core competency in green building principles.
- P. **Recycle:** Recovery and diversion of demolition or construction waste processed for use in place of a virgin material to create a new material.
- Q. **Repurposed Material:** A material that is harvested from demolition or construction waste that retains its original form and reused for other purposes. i.e. Woods originally used to construct barns repurposed as flooring.
- R. **Reuse of Material:** Maintain an existing structural or non-structural element of 'the work' left in place, and/or recovery of demolition or construction waste and subsequent incorporation into the work, and/or sold, donated, or repurposed for reuse in 'the work' or elsewhere.
- S. **Salvaged Material:** Recovery of demolition or construction waste and subsequent incorporation into the work or elsewhere to be repurposed, reused, sold, or donated.

- T. **Source Reduction:** A decrease in the amount of unnecessary material brought into a building in order to produce less waste. For example, purchasing products with less packaging is a source reduction strategy.
- U. **Universal Waste:** Hazardous items that are easily purchased and commonly used. Examples include batteries, pesticides, mercury-containing equipment, and light bulbs. See epa.gov/osw/hazard/wastetypes/universal/index.htm.
- V. **Waste-to-Energy:** The conversion of non-recyclable waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolysis, anaerobic digestion, and landfill gas (LFG) recovery.
- W. **Zero Waste:** The ethical, economical, efficient, and visionary goal to change culture towards sustainable natural cycles, where all discarded materials are designed to maintain usefulness as a resource. Zero waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials; to conserve and recover all resources so they are never burned or buried. Implementing zero waste eliminates all waste discharges to land, water, and air that threaten the health, well-being, and prosperity of marine and terrestrial environments, flora, fauna, and human.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition, deconstruction, and construction waste becomes property of Design Builder.
- B. Items of interest, financial value, historic value, architectural value, archaeological value such as accents, relics, antiques, that are structural or non-structural elements of the project building(s) or found as stand-alone objects and similar objects including, but not limited to materials, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to the User Agency that may be uncovered during demolition and/or deconstruction remain the property of User Agency.
 - 1). Carefully salvage, deconstruct in a manner to prevent damage and promptly return to User Agency.
 - 2). The User Agency must be made aware of each item or object of interest by a Design Builder provided catalogued 'Item of Interest Report'.
 - 3). The 'Item of Interest Report' shall be reviewed collaboratively [in-person] by the Design Builder and User Agency [User Agency's Representative] to identify 'items of interest' to the User Agency.
 - 4). The User Agency must verify in writing if the item, object, or material shall be retained for the User Agency OR offered for sale or donation to the contractor.

When no items of interest are present a letter stating 'No Items of Interest' have been found, identified, or located and presented to the User Agency.
 - 5). Items, objects, or materials of interest must be carefully salvaged or deconstructed in a manner to prevent damage, loss, and theft.

1.5 ACTION SUBMITTALS

- A. Construction and Demolition Waste Management Plan: Construction Waste Management Plan (CWMP) Submit CWMP within [7] [30] <# Days> of date established 'before' any demolition whatsoever and commencement of the Work or the Notice to Proceed.
 - 1). CWMP initial implementation report.
 - 2). CWMP implementation [monthly] [periodic] reports.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Forms for non-hazardous deconstruction and/or Demolition and Construction Waste and Hazardous Waste. Form and Reports must Include the following information:
- 1). Material Category – Material Waste Stream
 - 2). Commingled Waste Stream
 - 3). Waste Generation Point
 - 4). Total quantity of all project waste in **tons**. (Excluding land clearing debris and landscaping waste or debris.)
 - 5). Quantity of waste salvaged materials in **tons**. (If considered architectural or other items, approximate weight.)
 - 6). Quantity of waste recycled, diverted both estimated and actual in **tons**.
 - 7). Total quantity of waste recovered (deconstructed, salvaged, reused plus recycled, diverted) in **tons**.
 - 8). Total quantity of waste recovered (salvaged, reused, plus recycled, diverted) as a percentage (%) of total waste.
 - Reported monthly
 - Reported as a total sum of the projects':
 - Deconstruction
 - Demolition
 - Construction
- B. Waste Reduction Calculations: At Substantial Completion, submit calculated end-of-Project rates for diversion from landfill and incineration. In context of the total sum of waste for the project, itemize percentage (%) and weight of materials deconstructed, salvaged, recycled, reused, donated, sold, and disposed of in landfill as a percentage (%) of total waste generated by the Work.
- C. Records of Donations:
- 1). Indicate receipt and acceptance of salvageable waste donated to individuals and organizations.
 - 2). Indicate whether organization is tax exempt.
- D. Records of Sales:
- 1). Indicate receipt and acceptance of salvageable waste sold to individuals and organizations.
 - 2). Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Monthly Reports - Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed and/or certified to accept them.
- 1). Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them.
- 1). Include manifests, weight tickets, receipts, and invoices.
- G. Qualification Data: From Refrigerant recovery technician.
- H. Demolition – Deconstruction Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered.
- 1). Recovery was performed according to EPA regulations. Include name and address of technician, credentials, and date(s) refrigerant was recovered.
- I. Demolition – Deconstruction Refrigerant Recovery: Comply with requirements in Section 024116 "Structure Demolition" Section 024119 "Selective Demolition" for refrigerant recovery submittals.

1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: An experienced firm and/or vendor shall employ individual(s) employed and assigned by the Design Builder, with a record of successful waste management coordination and oversight of projects with similar requirements as stated within this section.
- 1). Design Builders' [Superintendent] [Waste Management Coordinator] [Sustainability Accredited Professional] [LEED Accredited Professional] [must] [may] [may not] serve as the project Waste Management Coordinator.
- B. Employ daily on-site dedicated construction waste management professional(s) whose sole responsibility is to oversee, manage, police, and report to the Design Builder's [Primary] [Project] project manager(s). Responsibilities include:
- 1). Daily - weekly waste bin timetable coordination: Quantity, type, size, locations.
 - 2). Daily - weekly waste bin transportation - hauling coordination and logging.
 - 3). Managing, policing, logging the on-site ground-level waste stream segregation process.
 - 4). Managing, policing, logging the on-site waste stream segregation process for all spaces with the project build spaces during and continuing through the building erection process.
 - 5). Managing, policing, logging the on-site waste stream segregation process for all spaces within the project building spaces [sub-contractor areas] [project administrative offices] [other] during and continuing through [interior fit-out] [FFE installation] processes.
 - 6). Coordination and enforcement of CWMP protocols for [commingled] [site-segregated] [hazardous] material waste streams.
 - 7). Coordination, management of all site and building(s) education and waste stream identification signage.
 - 8). Ongoing – Continuation of CWMP education.
 - 9). Distribute and post CWMP educational materials in English and languages specific to workers involved in deconstruction, demolition, and construction waste management activities.
- C. Report individual personnel who have exhibited CWMP practice deficiencies.
- 1). Waste Management Coordinator must police, follow, adhere to all parts of the Design Builders' Construction Waste Management Plan (CWMP) including the enforcement of applicable disciplinary actions.
 - 2). Waste Management Coordinator must be educated, knowledgeable, and familiar with the details contained within the CWMP.
 - 3). Waste Management Coordinator must be educated, knowledgeable, and familiar with the details of local, state, and federal guidelines, rules, and laws related to demolition and construction waste management as well as consumer and household waste.
- D. Refrigerant Recovery Technician Qualifications: [Type I] [Type II] [Type III] [Universal] certified by EPA-approved certification program(s).
- E. Refrigerant Recovery Technician Qualifications: Comply with requirements in [Section 024116 "Structure Demolition."] [Section 024119 "Selective Demolition."]
- F. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- G. Waste Management Conference(s), meetings, and Education: Conduct conference(s) and/or meetings on a regular basis at Project site to educate, inform all contracted personnel, sub-contractors, vendors including those who are brought onto the project during through construction phases and newly hired, non-regular, rotational, performing activities on the project site(s), project administration areas and offices, during the site clearing, deconstruction, demolition, construction, FFE fit-out and turn-over phases must comply with requirements in Section [01 31 00] "Project Waste Planning, Management and Coordination" and the Construction and Demolition Waste Management Plan (CWMP).
- H. Every individual associated with the deconstruction, demolition, construction, FFE Fit Out, security, Storm Water Management must be familiar with and become educated and aware of the implementation,

processes, methods and procedures related to the CWMP. The education process includes, but not limited to:

- 1). Review and discuss waste management plan including responsibilities of each Design Builder, sub-contractor, vendor, worker, and waste management coordinator [Superintendent] [CWMP Project Manager] [Other].
- 2). Include the CWMP as an ongoing topic during weekly construction update meetings and make note of discussions in minutes as applicable.
- 3). Announce current approximate diversion rate and/or details of materials reused, salvaged, donated, sold, deconstructed.
- 4). Review requirements for documenting quantities of each type of waste and its proper disposition (disposal).
- 5). Review and finalize procedures for materials separation, segregation, commingled waste streams.
- 6). Verify availability of containers and bins needed to avoid delays.
- 7). Review procedures for periodic waste collection and transportation to recycling, diversion, salvage, reuse, and disposal facilities.
- 8). Review waste management requirements for each trade.
- 9). Provide education for 100% of individuals associated with the project.
- 10). Provide the CWMP to each individual in their mother language.

1.8 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN

- A. General: Construction Team: Develop, prepare, and author a demolition and construction waste management plan [2] [4] [6] months before [deconstruction], [demolition] or construction work begins according to requirements in this Section AND the current version of LEED v4.1 BD+C for New Construction (NC). The CWMP shall consist of identifying [deconstruction] or [demolition] or [combined deconstruction and demolition] procedures, construction waste management procedures including [consumer, worker, administration offices waste management procedures]. The [Consumer and] Construction Waste Management Plan shall include:

- 1). Identification of waste streams.
- 2). A waste reduction work plan.
- 3). Submit proposed [demolition,] [deconstruction,] and removal procedures for approval [2] [4] [6] months before work is started.
- 4). Coordination with other work in progress [, a disconnection schedule of [utility services,] [Project Phasing] [Other]
- 5). Include in the plan procedures for careful removal and disposition of materials specified to be [salvaged], [deconstructed], [reused.]
- 6). A detailed description of methods and equipment to be used for each operation and of the sequence of operations.
- 7). Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed.
- 8). Append tracking forms for all removed materials indicating type, quantities, [weight] condition, destination, and end use or purpose.
- 9). [Include statements affirming Design Builder inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the work.]
- 10). Provide procedures for safe conduct of the work.
- 11). Remove rubbish and debris from construction site daily, unless otherwise directed.
- 12). Store materials that cannot be removed daily in areas specified by [Superintendent] [Construction Waste Management Coordinator] [Project Manager] [Other]
- 13). [Items to Remain in Place:
Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the User Agency.

Repair or replace damaged items as approved by [Superintendent] [Construction Waste Management Coordinator] [Project Manager] [Other].

Coordinate the work of this section with all other work indicated.

Construct and maintain shoring, bracing, and supports as required. Ensure structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed

Do not overload [structural elements] [pavements to remain].

Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the [Superintendent] [Construction Waste Management Coordinator] [Project Manager] [Other] prior to performing such work.]

- B. Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion.
- C. Specify whether materials will be source segregated, vendor facility segregated, or commingled and describe the segregation and commingled strategies planned for the project.
 - 1). Describe where the each material will be taken and how the vendor facility will process the material including expected diversion rates for each material stream.
 - 2). Describe phasing strategies during the course of pre-demolition, pre-deconstruction, site work, early construction, mid-construction, substantial construction completion, tabulation, and turn-over.
- D. Prepare to deliver a final quantitative report detailing all waste streams generated, diverted, salvaged, reused, sold, deconstructed measured by volume or weight.
 - 1). Volume or Weight measurement must be used consistently throughout the entire CWMP process.
 - 2). Alternative daily cover (ADC) does **not** qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.
- E. Waste Identification: Indicate anticipated types and quantities of [deconstruction] [demolition] [site-clearing] [and] [construction] waste generated by the Work. Use
 - 1). Site clearing, landscape debris, soils are **not** to be including CWMP waste or diversion calculations.
- F. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, diverted from landfill - incineration in any manner AND those that will be disposed of in landfill or incineration. Use [Form CWM-3 for construction waste] [and] [Form CWM-4 for demolition waste] [Provided Construction Waste Management Calculator] <Insert User Agency's form designation>.
 - 1). Include each point of waste generation, total project sum of all waste (excluding site clearing, landscaping), total project quantity of each type of each waste stream, commingled waste stream.
 - 2). Include means of recovery, handling, and transportation procedures. Maintain a monthly log of vendor supplied reports from the [commencement of demolition] [deconstruction] through the completion of construction including FFE fit out. Provide access to or provide digital copies of all monthly reports to [construction waste management coordinator] and internal and/or external [Sustainability Accredited Professional] Individual(s) responsible for LEED v4.1 BD+C NC performance green building third-party certification.
 - 3). Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with [Section 024116 "Structure Demolition."] [Section 024119 "Selective Demolition."]
 - 4). Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

- 5). Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 6). Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 7). Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 8). Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- G. Required Deconstruction Due-Diligence: During the CWMP planning phase, well before demolition or site clearing begins, investigate and document findings indicating feasibility of implementing a deconstruction process of whole and/or portions of buildings, elements, systems, and/or specific material harvesting. i.e. Brick, Pavers. Deconstruction may be the most efficient, least costly method of diverting materials from landfill, and most likely lead to the highest quantity of material reuse, repurpose, salvage, or sales, and donation from existing buildings.
- 1). Refer to the following for required Deconstruction Due-Diligence, feasibility and implementation:
 Whole Building Design Guide: Federal Green Construction Guide for Specifiers: http://www.wbdg.org/FFC/EPA/FEDGREEN/fgs_024113.pdf
 EPA Deconstruction Rapid Assessment Tool
<https://www.epa.gov/large-scale-residential-demolition/deconstruction-rapid-assessment-tool>
 EPA Pre-Demolition Planning
<https://www.epa.gov/sites/production/files/2015-09/documents/cleveland.pdf>
 - 2). Author - Implement – Execute ‘Deconstruction Plan’.
 Collaborating with the Deconstruction Company: Create a Deconstruction Plan. The plan shall include a narrative describing the process, itemized deconstructed materials by type, value, weight [volume] [quantity], condition, age, where in the building materials were extracted – harvest point(s), and special items.
 Include in CWMP diversion calculations.]
- H. [Cost - Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use **[Form CWM-5 for construction waste]** **[and]** **[Form CWM-6 for demolition waste]** **<Insert User Agency's form designation>**. Include the following:]
- 1). Total quantity of waste.
 - 2). Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
 - 3). Total cost of disposal (with no waste management).
 - 4). Revenue from salvaged materials.
 - 5). Revenue from recycled materials.
 - 6). Savings in transportation and tipping fees by donating materials.
 - 7). Savings in transportation and tipping fees that are avoided.
 - 8). Handling and transportation costs. Include cost of collection containers for each type of waste.
 - 9). Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS

1.1 HAZARDOUS WASTE:

- A. It is required and strictly enforced that all hazardous waste be managed, stored, and disposed of according to local, state, federal laws, whichever is most stringent. Hazardous waste includes but is not limited to: Wastes identified by the Resource Conservation and Recovery Act (RCRA) as**

'hazardous' if it is ignitable, corrosive, reactive, and/or toxic to humans, animals, plants, environment and/or is listed as hazardous (40 CFR 261 Subparts C and D)

1. **A Solid waste material, product, system, chemical, liquid, sludge, solid gas, substance that can be considered dangerous, harmful, toxic to human beings and the natural environment. Hazardous waste streams include but are not limited to:**
 2. **Lead Paints and Asbestos** from the demolition or deconstruction phases either within a building, connected infrastructure, or foundation.
 3. **PBTs (Persistent Bioaccumulative Toxins): Chemicals and neurotoxins which break down extremely slowly in the environment, accumulate within animal tissues in increasing concentrations up the food chain, remain in the environment for long periods of time, and are not readily destroyed, (Mercury, Polychlorinated biphenyls (PCBs), Hexachlorobenzene (HCB), etc.)** <https://www.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-rules-under-tri>
 - a. **Petroleum based products**
 - b. **Pesticides**
 - c. **Chemicals**
 - d. **Herbicides**
 4. **Batteries – ALL Primary and Secondary: Stand-alone Batteries and those found sealed within Electronic Components and Hand-held Devices; Rechargeable and Non-rechargeable. Including but not limited to:**
 - **Coin - Button Type:** (Mercury - Silver Oxide, Zinc Air) Watches, Medical Devices, hearing aides, toys, computer time keeping (found on motherboards), cameras,
 - **Automotive:** Lead-acid, Lead-acid Gel, Sealed Lead-acid (VRLA), Hybrid Automotive.
 - **Power Tools:** Lithium-ion (Li-on), Nickel-Cadmium (NiCd), Nickel Metal Hydride
 - **Consumer - Household:** Alkaline, Lithium. (AAA, AA, C, D, 9-Volt)
 - **Mobile – Portable Devices:** Mobile phones, smart phones, tablet devices, laptop computers, measuring instruments.
 5. **Mercury Containing Lamps**
 6. **Electronic Waste (e-Waste) including Cathode Ray Tubes (CTR Televisions – Computer Monitors)**
 7. **Medical Waste**
 8. **Cleaning Products**
 9. **Paints, sealants, adhesives, coatings.**
- B. The Design Builder and Sub-Contractors handling, providing, and/or installing and/or mitigating any items, products, and materials identified as hazardous shall provide documentation and/or

certification attesting to the qualifications to handling, providing, and/or installing and/or mitigating such materials.

- C. The Design Builder and Sub-Contractors handling, providing, and/or installing and/or mitigating any items, products, and materials identified as hazardous shall provide documentation attesting to their methods and processes for the proper disposal of hazardous materials.
- D. **Any and all violations**, non-compliance with proper storage, management, disposal of hazardous waste may be grounds for dismissal, discontinuation of contract, and report to local, state, federal agencies with associated fines.

!! Language pertaining to the proper identification, handling, storage, and disposal of hazardous materials and products shall be part of the Design Builders' – Subcontractors' contract language!!

1.2 RECYCLING RECEIVERS AND PROCESSORS

- A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:
 - 1). Provide 'each' Design Builder, sub-contractor, and trade demolition and construction waste vendor handling any non-hazardous and hazardous waste for the project.
 - a Vendor Company: Name, Full Address, email, website
 - b Function i.e. Hauling, separation, deconstruction recycling, landfill, or [other].
 - c Primary Contact: Name, Position, email, office phone, cell phone
 - d Waste Stream(s) handled.
 - e Narrative describing the handling and/or processing of each waste stream, including commingled.
 - f Method of handling and disposal of hazardous waste, as applicable.
 - g Certified Commingled Recycling Facility: Yes/No, certifying or Evaluation body.
Verification of Certification: Evaluation Report
 - 2). Provide company name, main contact individuals, names and full contact information of each vendor handling, receivers and processors of deconstruction, demolition and diversion materials.
- B. To meet requirements and qualify 'commingled waste' as a single waste stream for the purposes of the CWMP and LEED v4.1 credit MRc5: Construction and Demolition Management: The facility must be a **Certified Commingled Recycling Facility**: A construction waste processing facility which is third-party certified to properly manage and measure commingled and single waste streams.
 - 1). The Recycling Certification Institute (RCI) (<https://www.recyclingcertification.org/certified-facilities/>) or other approved third-party certification body may qualify the vendor as Certified Commingled Recycling Facility.
 - 2). If the project's construction waste management plan includes or intends to include 'commingled waste' as a waste stream and the vendor is **not** RCI [Other] certified encourage the vendor to register for the RCI [Other] third-party certification process so they may achieve certification prior to the commencement of Deconstruction, Demolition, and Construction Waste Management activities. <https://www.recyclingcertification.org/contact-us/>

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide a final end-of-project report detailing all major waste streams generated, including disposal and diversion rates. Calculations can be by weight or volume but must be consistent throughout.
 - 1). Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

- 2). Exclude excavated soil, land-clearing debris from calculations.
 - 3). Include materials destined for alternative daily cover (ADC) in the calculations for total waste generated but not diverted waste.
 - 4). Include wood waste converted to fuel (biofuel) in the calculations; other types of waste-to-energy are not considered diversion.
- B. Each building must account for and calculate its own deconstruction, demolition and construction waste materials separately. If phasing has both buildings generating waste simultaneously, a strategy must be developed to ensure calculations are segregated.
- C. Achieve end-of-Project rates for diversion from landfill and incineration/salvage/reuse nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators.
- D. The Goal of the project is to Divert 75% and Three (3) material streams: Divert at least 75% of the total construction and demolition material. Diverted materials must include at least three material streams.
- E. [The Goal is to Divert 75% of materials using a Certified Commingled Recycling Facility and One more material stream: Divert at least 75% of the total construction and demolition material. Diverted materials must include at least 2 material streams. All commingled recycling must be sent to off-site sorting facility(ies) certified by the Recycling Certification Institute or approved equivalent.]
- F. [The Goal is to Reduce the Total (Construction and Demolition) Waste Material: Salvage or recycle renovation and demolition debris and utilize onsite waste minimizing design strategies for new construction activities. Do not generate more than 7.5 pounds of construction waste per square foot of the building's floor area. Create a narrative describing how a project is addressing waste prevention and/or achieving waste generation thresholds via design strategies and onsite waste minimization practices.]
- G. Waste Streams: Retain "Demolition Waste" and "Construction Waste" [Deconstructed Waste] in "General" Paragraphs above to suit the Project. Below are examples of common demolition and construction [Deconstructed] waste that can be salvaged or diverted; revise list or insert other types of waste to suit Project; verify capabilities of local diversion strategies, vendors, and facilities.
- 1). Asphalt
 - 2). Concrete
 - 3). Metals
 - 4). Brick
 - 5). Woods
 - 6). Insulations
 - 7). Gypsum board
 - 8). Ceiling Tile and Panels
 - 9). Ceramic Tile
 - 10). Carpet
 - 11). Carpet Pad
 - 12). Copper Wiring
 - 13). Architectural Accents
 - 14). Windows
 - 15). Doors
 - 16). Flooring
 - 17). Composite Woods
 - 18). Moldings – Casework
 - 19). Cabinetry
 - 20). Lighting Fixtures
 - 21). Water Fixtures
 - 22). Urinals – Water Closets – Sinks
 - 23). Janitor Sinks
 - 24). Commercial Kitchen Equipment and Appliances
 - 25). Residential Kitchen Equipment and Appliances

- 26). Laundry Equipment
- 27). HVAC Equipment and Controls
- 28). Ductwork
- 29). Insulations: Thermal - Acoustic
- 30). Other

- 31). Packaging: FFE and Other: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or divert the maximum amount possible of the following uncontaminated packaging materials:
 - Papers
 - Cardboards
 - Boxes
 - Plastic – Metal – Fiber Strappings
 - Plastic Sheets and Films
 - Protective Films
 - Polystyrene Packaging
 - Wood or other Crating
 - Wood or Other Pallets
 - Plastic Pails

- 32). Design Builder, Sub-Contractor, Trade, Construction Administration Office and Worker Waste: Regardless of salvage/recycle goal indicated in "General" Paragraphs, salvage or divert the maximum amount possible of the following construction administration office, worker waste materials and create an 'Administration Office Waste Reduction Plan':
 - Papers
 - Cardboard
 - Metals
 - Glass
 - Batteries
 - Mercury Containing Lamps
 - E-Waste
 - Furniture
 - Temporary Partitions
 - Temporary Office Cubicles
 - Organic Waste (Food)

PART 3 - EXECUTION

1.1 PLAN IMPLEMENTATION

- A. General: Implement the approved construction waste management plan (CWMP).
 - 1). Provide all education program in 'all' primary spoken and written languages applicable to Design Builder, sub-contractors, and trades. English [Spanish] [Russian] [other][other]
 - a CWMP
 - b All On-Site Signage – Construction offices, Bins, Containers, Stand-alone signs, etc.
 - c Onboarding Education
 - d Disciplinary actions - spoken and written
 - 2). Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 3). Ensure full-time Waste Management Coordinator(s) are dutifully upholding the measures, goals, and intents outlined in the CWMP. Ensure oversight and policing necessary to successfully achieve the requirements and goals stated in the CWMP.
 - 4). Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1). Distribute waste management plan to all personnel within 3 days of start of work.
 - 2). Distribute waste management plan to entities when they first begin work. Review plan procedures and locations established for deconstruction, demolition, salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1). Designate and label specific areas on Project site necessary for separating materials to be deconstructed, salvaged and diverted.
 - 2). Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.
- E. Waste Management in Historic Zones or Areas: Transportation equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by [12 inches] or more.

1.2 SALVAGING - DECONSTRUCTING DEMOLITION WASTE

- A. Comply with requirements in [Section 02 41 16 "Structure Demolition"] [Section 02 41 19 "Selective Demolition"] [Section 02 42 96 "Historic Removal and Dismantling] for salvaging demolition waste.
- B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1). Clean salvaged items.
 - 2). Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3). Store items in a secure area until installation.
 - 4). Protect items from damage during transport and storage.
 - 5). Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for [Sale] [and] [Donation]:
- D. Salvaged Items for User Agency's Use: Salvage items for User Agency's use and handle as follows:
 - 1). Clean salvaged items.
 - 2). Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3). Store items in a secure area until delivery to User Agency.
 - 4). Transport items to User Agency's storage area [on-site] [off-site] [designated by User Agency].
 - 5). Protect items from damage during transport and storage.
- E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- G. Plumbing Fixtures: Separate by type and size.
- H. Lighting Fixtures: Separate lamps by type and protect from breakage.

- I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

1.3 DIVERSION [DECONSTRUCTION] **DEMOLITION AND CONSTRUCTION WASTE, GENERAL**

- A. General: Divert paper, [organic food waste], and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall [accrue to User Agency] [accrue to Design Builder] [be shared equally by User Agency and Design Builder].
- C. Preparation of Waste: Prepare and maintain divertible waste materials according to recycling, salvage, deconstruction, or reuse facility requirements.
 - 1). Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the diversion process.
- D. Procedures: Separate divertible waste from other waste materials, trash, and debris. Separate recyclable waste streams by type at Project site to the maximum extent practical according to approved CWMP.
 - 1). Provide appropriately marked containers or bins and signage for controlling recyclable waste until removed from Project site.
 - Provide a detailed list of acceptable and unacceptable materials at each container and bin and/or signage.
 - 2). Design Builders' designated construction [waste coordinator] [Superintendent] [Manager] [Other] shall regularly inspect containers and bins daily for contamination and remove contaminated materials if found.
 - 3). Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 4). Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 5). Store components off the ground and protect from the weather.
 - 6). Remove recyclable waste from User Agency's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

1.4 DIVERTING DEMOLITION WASTE

- A. Asphalt Paving: Grind asphalt to maximum [1-1/2-inch] [4-inch] size.
 - 1). Crush asphaltic concrete paving and screen to comply with requirements in Section 312000 "Earth Moving" for use as general fill.
- B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1). Pulverize concrete to maximum [1-1/2-inch] [4-inch] size.
 - 2). Crush concrete and screen to comply with requirements in Section 312000 "Earth Moving" for use as satisfactory soil for fill or subbase.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1). Pulverize masonry to maximum [3/4-inch] [1-inch] [1-1/2-inch] [4-inch] size.
 - a). Crush masonry and screen to comply with requirements in Section 31 20 00 "Earth Moving" for use as [general fill] [satisfactory soil for fill or subbase].
 - b). Crush masonry and screen to comply with requirements in Section 32 93 00 "Plants" for use as mineral mulch.

- 2). Clean and stack undamaged, whole masonry units on wood pallets.
- E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- F. Metals: Separate metals by type.
 - 1). Structural Steel: Stack members according to size, type of member, and length.
 - 2). Remove and dispose of bolts, nuts, washers, and other rough hardware.
- G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1). Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- L. Carpet Tile: Remove debris, trash, and adhesive.
 - 1). Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- M. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- N. Conduit: Reduce conduit to straight lengths and store by material and size.
- O. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

1.5 DIVERTING CONSTRUCTION WASTE

- A. Packaging:
 - 1). Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2). Polystyrene Packaging: Separate and bag materials.
 - 3). Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4). Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 - 1). Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2). Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
Retain subparagraph below if recycled sawdust is permitted in the Work. If permitted, insert requirement to allow its use in Section 329300 "Plants."
Comply with requirements in Section 329300 "Plants" for use of clean sawdust as organic mulch.

- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 - 1). Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
 - a). Comply with requirements in Section 329300 "Plants" for use of clean ground gypsum board as inorganic soil amendment.
- D. Paint: Seal containers and store by type.

1.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1). Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2). Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. **Burning Prohibited:** Do not burn waste materials. It is strictly forbidden to burn any type of material. **Any and all violations**, non-compliance may be grounds for dismissal, discontinuation of contract, and report to local, state, federal agencies with associated fines.

1.7 [ATTACHMENTS

- A. Form CWMP-1 for construction waste identification.
- B. Form CWMP-2 for demolition waste identification.
- C. Form CWMP-3 for construction waste reduction work plan.
- D. Form CWMP-4 for demolition waste reduction work plan.
- E. Form CWMP-5 for cost/revenue analysis of construction waste reduction work plan.
- F. Form CWMP-6 for cost/revenue analysis of demolition waste reduction work plan.
- G. Form CWMP-7 for construction waste reduction progress report.
- H. Form CWMP-8 for demolition waste reduction progress report.
- I. Form CWMP-8 for deconstruction progress report.]

SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS

GENERAL

- 1.1 [Design – Build Design Builder User Agency Identification: Specification items 'may' be identified by the User Agency and further detailed within the OPR (Owner Program Requirements) and/or Schematic Design as:
- A. Desired [Other]: User Agency's Preference to Include
 - B. Targeted [Other]: Goal
 - C. Required [Other]: Requirement, Must be Included. Alternate paths may be acceptable.
 - D. Do Not Deviate: [Other] Requirement. Must be Included as specified in Schematic Design plans and/or specifications.]

2.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 General Requirements Specification Sections, apply to this Section.

2.3 SUMMARY

- A. Section includes general requirements and procedures for compliance with project specific sustainability prerequisites and credits needed for the Project to achieve U.S. Green Building Council® "LEED® v4 – v4.1 for Building Design and Construction" New Construction (NC), hereafter, LEED v4 – v4.1 BD+C NC.
- 1. The ultimate certification level goal is LEED v4 – v4.1 BD+C NC, LEED Gold®.
 - 1. The minimum required certification level is LEED v4 – v4.1 BD+C NC LEED Silver®.
 - 2. Specific requirements for LEED Building Design and Construction (BD+C) New Construction (NC) v4 – 4.1 are also included in other Sections.
 - 3. Some LEED v4 – v4.1 BD+C NC prerequisites and credits must be achieved to meet LEED certification requirements. Achievement heavily depends on product selections which may not be specifically identified as LEED® v4 – v4.1 BD+C NC requirements.
 - 4. Compliance with requirements needed to achieve LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests. If retaining first subparagraph below, attach a copy of the LEED checklist/scorecard to the end of this Section as information for Design Builder.
 - 5. A copy of the LEED Building Design and Construction v4 – 4.1 New Construction (NC) Project checklist/scorecard can be found at the end of this Section.
 - a) It is to be used as a reference and information for the project's intended credit pursuits. The checklist/scorecard is a living document and may change throughout the design and construction phases.
 - b) Some LEED prerequisites and credits needed to achieve the indicated LEED v4 – v4.1 BD+C NC certification level threshold goal of LEED Gold® depend on the architectural, engineering, civil, landscape design and other aspects of the Project that may not be part of the Work of the Contract.
 - 6. No matter what credit and credit point changes may occur during design and construction LEED Gold® is the ultimate goal, LEED Silver® as the required minimum.

2.4 DEFINITIONS: PERFORMANCE GREEN BUILDING - SUSTAINABILITY RATING SYSTEMS

- A. Retain terms that are identified after this Section. Definitions that are a part of "LEED® v4 - v4.1 for Building Design and Construction" (BD+C) New Construction (NC) apply to this Section in addition to other sections.

- B. **LEED® BD+C Rating System Set:** The U.S. Green Building Council authors all LEED rating systems. LEED v4 - v4.1, are the two current versions available for project registration. The Building Design and Construction is comprised of 8 rating systems. Definitions within Section may also apply to Divisions 3-10, 32, 33.
- C. **Arc™:** State-of-the-art digital platform that allows any project—whether a single building, a community or an entire city—to measure improvements and benchmark against itself and projects around it.
<http://arcskoru.com/>
- D. **Green Business Certification, Inc.™ (GBCI®):** is headquartered in Washington, D.C. and is the premier organization independently recognizing excellence in green business industry performance and practice globally. GBCI is the building certification and accredited professional credentialing body that administers third-party building certifications and professional credentials for LEED®, ParksmartSM, SITES®, TRUE™, and WELL™.
- E. **International WELL Building Institute™ (IWBI™):** IWBI delivers the cutting-edge WELL Building Standard™, the leading global rating system and the first to be focused exclusively on the ways that buildings, and everything in them, can improve our comfort, drive better choices, and generally enhance, not compromise, our health and wellness.
- F. **Integrative Process:** An integrative process is a comprehensive approach to building systems and equipment. Project team members look for synergies among systems and components, the mutual advantages that can help achieve high levels of building performance, human comfort, and environmental benefits. The process should involve rigorous questioning and coordination and challenge typical project assumptions. Team members collaborate to enhance the efficiency and effectiveness of every system.
1. The Integrative Process credit goes beyond checklists and encourages integration during early design stages, when clarifying the owner's aspirations, performance goals, and project needs will be most effective in improving performance. An integrative process comprises three phases.
 - a) Discovery
 - b) Design – Construction (Schematic)
 - c) Occupancy – Operations - Feedback
- G. **LEED®:** Leadership in Energy and Environmental Design: A series of more than 25 Internationally recognized performance green building rating systems comprised of 7 rating system sets authored by the U.S. Green Building Council headquartered in Washington D.C.. Rating system sets include: Building Design and Construction (BD+C), Interior Design and Construction (ID+C), Existing Building Maintenance and Operations (EBOM), Neighborhood Development (ND), Residential (Homes), Transit Stations, and Cities.
1. LEED provides a rigorous and obtainable framework for identifying and implementing practical, measurable performance green building design, construction, operations and maintenance solutions focused on, Location and Transportation, Sustainable Sites, Water Efficiency, Energy Efficiency, Materials and Resources, Indoor Environmental Quality, and Innovation.
- H. **LEED v4 and v4.1,** are the two current versions available for project registration. LEED v4 was launched November 2013. An incremental launch of LEED v4.1 began in March of 2018 by rating system set.
1. February 19, 2019 the USGBC announced that in addition to registering projects under LEED v4 or v4.1, project teams have the option of registering under v4 with the ability to use any and all LEED v4.1 prerequisites and credits the project team chooses.
<https://www.usgbc.org/articles/substitute-any-leed-v4-credit-leed-v4.1>
- I. **LEED Accredited Professional: (LEED AP®):** Dedicated technical experts to ensure building certification meets the highest levels of quality, rigor, and integrity.
- A. **LEED Green Associate®:** A foundational professional credential signifying core competency in green building principles.
 - B. **LEED AP with Specialty:** An advanced professional credential signifying expertise in green building and a LEED rating system set. (BD+C, O+M, ID+C, ND, Homes)

- C. **LEED Fellow:** The LEED Fellow is GBCI's most prestigious credential, awarded to outstanding LEED APs who have demonstrated exceptional achievement in key mastery elements, have a history of leadership and have made significant contributions to green building and sustainability.
- J. **LEED Online:** (<https://www.leedonline.com/>) The GBCI web-based verification documentation portal for LEED [other] project building [Block] [Master Site] [Portfolio] [Campus] [Home] [City] [Community] rating system:
1. Registration
 2. Design - Construction Application Timeline
 3. Official GBCI Certification Level Achievement
 4. Team Member Activity History Log
 5. Prerequisite – credit – Project Information Forms
 6. Prerequisite – credit documentation verification submittal uploads
 7. Prerequisite – credit project scorecard designation
 - a) Anticipated, Approved, Attempted, Awarded, Denied, Not Approved, Not Attempted, Pending, Ready for Review, Under Review, or Withdrawn
 8. Project Team Members and Role
 9. GBCI Prerequisite – credit – Project Information Review Comments - History Log
 10. Licensed Professional Exemption (LPE) Team Member Identifier
 11. Fees and Payments
- K. **LEED®: Scorecard/Checklist:** Checklist and/or Scorecard document identifying primary information for third-party performance green building certification and are living documents, changing throughout the design and construction phases:
1. Rating system author: [U.S. Green Building Council]
 2. Rating system set: BD+C **LEED [WELL]** specific rating system to be used for the project, rating system version.
 3. Rating System for the Project: [New Construction (NC)]
 4. Rating System version: **LEED [WELL]** v4 v4.1 [v2.0]
 5. Project Title, Address
 6. Date: Original Draft, Date: Current Draft
 7. Rating System Prerequisites and Credits [Features] [Preconditions] [Optimizations]
 8. Stakeholder – Design Team – Construction collaboratively decided upon credit pursuit identification.
 - a) **Yes (Y):** Credit shall be pursued for achievement
 - b) **Yes – Maybe (?Y):** Credit has a high probability of achievement, however additional data is required to confirm.
 - c) **No – Maybe (?N):** Credit has a low probability of achievement, however additional data is required to confirm.
 - d) **No (N):** Credit is not being pursued
 9. Regional Priority Points: Additional point is awarded for achieving the zip code identified credit and its achievement level threshold: 6 Regional Priority points are available – 4 points is the maximum allotted per project.
- L. **U.S. Green Building Council® (USGBC®)** is a 501c3 non-profit organization dedicated to the transformation of how vertical built environments are sustainable building design and construction. Its mission is to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life.
- M. **WELL Building Standard™:** WELL is premised on a holistic view of health: human health as not only a state of being free of disease - which is indeed a fundamental component of health - but also of the enjoyment of productive lives from which we derive happiness and satisfaction. Healthy spaces protect us from that which can make us sick, promote practices that can keep us well, and facilitate opportunities for us to connect with one another and live our lives to the fullest.

2.5 SUSTAINABILITY REQUIREMENTS: DEFINITIONS

- A. **Abandoned property:** property left behind intentionally and permanently when it appears that the former owner does not intend to come back, pick it up, or use it. One may have abandoned the property of contract rights by not doing what is required by the contract. However, an easement and other land rights are not abandoned property just because of nonuse. Abandoned land is defined as land not being used at the present time but that may have utilities and infrastructure in place.
- B. **Advanced Inventory & Assessment:** The end use product meets the requirements of any of the following:
1. Manufacturer Inventory or Health Product Declaration (HPD): The product has demonstrated a chemical inventory to at least 0.01% by weight (100 ppm) with no GreenScreen LT-1 hazards or GHS Category 1 hazards. The HPD or Manufacturer Inventory must be third party verified.
 2. Manufacturer Inventory or HPD: The product has demonstrated a chemical inventory to at least 0.01% by weight (100ppm) and at least 75% by weight of product is assessed using GreenScreen Benchmark assessment. The remaining 25% by weight of product has been inventoried. The GreenScreen assessment must be publicly available. The HPD or Manufacturer Inventory must be third-party verified.
 3. Declare labels designated as Red List Free that are third-party verified.
 4. Cradle to Cradle: Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Silver level or higher.
- C. **ANSI/BIFMA e3 Furniture Sustainability Standard:** The documentation from the assessor or scorecard from BIFMA must demonstrate the product earned at least 3 points under 7.5.1.3 Advanced Level in e3-2014 or 3 points under 7.4.1.3 Advanced Level in e3-2012.
- D. **Bio-based Materials:** Bio-based raw materials other than wood must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material.
- E. **BUG Rating:** (Backlight, Uplight, Glare) Classification system for artificial light emitted (zonal lumen distribution) from light fixtures (luminaire). An evaluation of luminaire optical performance related to light trespass, sky glow, and high angle brightness control. The 'BUG' rating replaces the old measuring system known as the "cut-off system".
- F. **Chain-of-Custody:** chain of custody (CoC) a procedure that tracks a product from the point of harvest or extraction to its end use, including all successive stages of processing, transformation, manufacturing, and distribution. COC numbers and/or certificates attest to solid wood(s) and composite woods used in products are obtained from forests certified by an FSC-accredited certification body and comply with FSC STD-40-004 v2-1. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body. FSC Chain-of-Custody certification traces the path of products from forests through the supply chain. Any company in this supply chain, including harvesters, processors, manufacturers, distributors, printers, retailers* or anyone that is taking ownership of the forest product before the end user or to use the FSC label must be a FSC certified organization. FSC certified material is to be clearly identified or kept separated from non-certified material throughout the chain. Consult the FSC Certificate Database to determine if a company is FSC certified and product certifications with their associated FSC COC. <https://us.fsc.org/fsc-certificate-database.311.htm>
- G. **Cradle to Cradle:** Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Bronze level or higher.
- H. **Cradle-to-gate assessment:** analysis of a product's partial life cycle, from resource extraction (cradle) to the factory gate (before it is transported for distribution and sale). It omits the use and the disposal phases of the product.
- I. **Cultural Landscape:** an officially designated geographic area that includes both cultural and natural resources associated with a historic event, activity, or person or that exhibits other significant cultural or aesthetic values.

- J. **Declare:** The Declare product label must meet the following requirements:
1. Declare labels designated as Red List Free or Declared.
 2. Declare labels designated as LBC Compliant that demonstrate content inventory to 0.1% (1000ppm)
- K. **Deconstruction:** The selective, methodical dismantlement of a built environment - building, or site in whole or in-part as a waste management planning strategy. The harvest of materials and/or architectural elements and/or building systems that may be re-used, repurposed, recycled, salvaged, and/or hold financial or historical value.
- L. **Diversion Waste:** Any safe, regulation, and code compliant means of keeping demolition, construction, commercial, healthcare, industrial, consumer, household, solid wastes from entering landfills or being incinerated. Methods include: Recycling, reusing, repurposing, donating, and salvaging.
- M. **Corporate Sustainability Report:** A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain.
- N. **Cultural Landscape:** An officially designated geographic area that includes both cultural and natural resources associated with a historic event, activity, or person or that exhibits other significant cultural or aesthetic values.
- O. **Electronic Waste (E-Waste):** Discarded portable devices (mobile phones, electronic tablets, headphones), office and consumer equipment (computers, monitors, copiers, printers, mice, scanners, fax machines), appliances (refrigerators, dishwashers, water coolers), external power adapters, and televisions and other audiovisual equipment.
- P. **Enclosure:** The exterior plus semi-exterior portions of the building. Exterior consists of the elements of a building that separate conditioned spaces from the outside (i.e., the wall assembly). Semiexterior consists of the elements of a building that separate conditioned space from unconditioned space or that encloses semi-heated space through which thermal energy may be transferred to or from the exterior or conditioned or unconditioned spaces (e.g., attic, crawl space, basement)
- Q. **Environmentally Preferable Product (EPP):** A product, material, assembly, or system exhibiting characteristics that pose low-no danger to human health, are sustainable and resilient. EPPs align with sustainable design, construction, operations, and maintenance attributes as defined by the U.S Green Building Council and other organizations. Examples include but are not limited to products and materials:
1. Recycled, Reused, Repurposed, Salvaged
 2. Environmental Product Declarations
 3. Health Product Declarations
 4. Bio-Based
 5. Forest Stewardship Council Certified (FSC)
 6. Regionally Sourced – Extracted – Manufactured - Purchased (100 miles)
 7. Global Reporting Initiative (GRI) Reporting
 8. Low – No VOC Emitting
 9. ULEF: Ultra-Low Emitting Formaldehyde
 10. NAUF: No-Added Urea-Formaldehyde
 11. Third-Party Certified – Third-Party Recognized : GreenScreen Benchmark, Cradle to Cradle, Declare, REACH, [Other]
 12. Product Lens
 13. [Others]
- R. **Environmental Product Declaration (EPD):** a statement that the item meets the environmental requirements of ISO14021–1999, ISO 14025–2006 and EN 15804, or ISO 21930–2007
1. **Product-specific Type III EPD** -- Internally Reviewed. Products with an internally critically reviewed LCA in accordance with ISO 14071 that have at least a cradle to gate scope.

2. **Industry-Wide EPD:** Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator.
- S. **Extended Producer Responsibility:** Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility.
- T. **Facts – NSF/ANSI 336:** Sustainability Assessment for Commercial Furnishings Fabric at any certification level.
- U. **FFE - Furniture, Fixtures, and Equipment:** FFE includes shelving, office and/or modular partitions (including internal wiring & devices), appliances, movable furniture, desks, chairs, computers, electronic equipment, data & phone equipment, tables, bookcases and partitions. FFE is also defined to include equipment that has no permanent connection to the structure of a building or utilities.
- V. **Furniture and Furnishings:** Stand-alone – Non-permanent furniture and accessory items purchased for the project, including individual and group seating; open-plan and private-office workstations; desks and tables; storage units, credenzas, bookshelves, filing cabinets, and other case goods; wall-mounted visual-display products (e.g., marker boards and tack boards, excluding electronic displays); and miscellaneous items, such as easels, mobile carts, freestanding screens, installed fabrics, and movable partitions. Hospitality furniture is included as applicable to the project. Office accessories, such as desktop blotters, trays, tape dispensers, waste baskets, and all electrical items, such as lighting and small appliances, are excluded.
- W. **Hazardous Material:** any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.
- X. **Hazardous Waste:** Wastes identified by the Resource Conservation and Recovery Act (RCRA) as hazardous if it is ignitable, corrosive, reactive, and/or toxic and/or is listed as hazardous (40 CFR 261 Subparts C and D)
1. A Solid waste material, product, system, chemical, liquid, sludge, solid gas, substance that can be considered dangerous, harmful, toxic to human beings and the natural environment. Hazardous waste streams include but are not limited to:
 2. **PBTs (Persistent Bioaccumulative Toxins):** Chemicals and neurotoxins which break down extremely slowly in the environment, accumulate within animal tissues in increasing concentrations up the food chain, remain in the environment for long periods of time, and are not readily destroyed, (Mercury, Polychlorinated biphenyls (PCBs), Hexachlorobenzene (HCB), etc.) <https://www.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-rules-under-tri>
 3. Petroleum based products
 4. Pesticides - Herbicides
 5. Chemical Compounds
 6. Batteries – ALL Primary and Secondary: Stand-alone Batteries and those found sealed within Electronic Components and Hand-held Devices; Rechargeable and Non-rechargeable. Including but not limited to:
 - a) **Coin - Button Type:** (Mercury - Silver Oxide, Zinc Air) Watches, Medical Devices, hearing aides, toys, computer time keeping (found on motherboards), cameras,
 - b) **Automotive:** Lead-acid, Lead-acid Gel, Sealed Lead-acid (VRLA), Automotive.
 - c) **Power Tools:** Lithium-ion (Li-on), Nickel-Cadmium (NiCd), Nickel Metal Hydride
 - d) **Consumer - Household:** Alkaline, Lithium. (AAA, AA, C, D, 9-Volt)
 - e) **Mobile – Portable Devices:** Mobile phones, smart phones, tablet devices, laptop computers, measuring instruments.
 7. Mercury Containing Lamps
 8. Electronic Waste (e-Waste) including Cathode Ray Tubes (CTR Televisions – Computer Monitors)

9. Medical Waste
 10. Cleaning Products
 11. Paints and Coatings
 12. Sealants
 13. Adhesives
- Y. **Health Product Declaration (HPD):** The end use product has a published, and complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
- Z. **Historic Building:** a building or structure with historic, architectural, engineering, archeological, or cultural significance that is listed or determined to be eligible as a historic structure or building, or as a contributing building or structure in a designated historic district. The historic designation must be made by a local historic preservation review board or similar body, and the structure must be listed in a state register of historic places, be listed in the National Register of Historic Places (or a local equivalent outside the U.S.), or have been determined eligible for listing.
- AA. **Historic District:** a group of buildings, structures, objects, and sites that have been designated as historically, architecturally, or culturally significant and categorized as either contributing or noncontributing.
- BB. **Inherently Nonemitting Sources:** Product is an inherently nonemitting source of VOCs (Stone, ceramic, powder coated metals, plated or anodized metal, glass, concrete, clay, brick and unfinished or untreated solid wood) and has no integral organic-based surface coatings, binders, or sealants.
- CC. **International Alternative Compliance Path – REACH Optimization:** End use products and materials have fully inventoried chemical ingredients to 100 ppm and assess each substance against the Authorization List – Annex XIV, the Restriction list – Annex XVII and the SVHC candidate list, (the version in effect June 2013,) proving that no such substance is included in the product. If the product contains no ingredients listed on the REACH Authorization, Restriction, and Candidate list.
- DD. **Life-cycle Inventory:** a database that defines the environmental effects (inputs and outputs) for each step in a material's or assembly's life cycle. The database is specific to countries and regions within countries.
- EE. **Life-cycle Assessment:** Specific Life-cycle assessment and environmental product declarations declaration. Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
- FF. **Light Pollution:** Waste light from building sites that produces glare, is directed upward to the sky, or is directed off the site. Waste light does not increase nighttime safety, utility, or security and needlessly consumes energy. Light pollution negatively impacts the nocturnal natural environment, flora and fauna and reduces view of the natural night time sky.
- GG. **Manufacturer Inventory:** The manufacturer has published complete content inventory for the product following these guidelines:
1. **A publicly available inventory** of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN) and/or European Community Number (EC Number).
 2. **Materials defined as trade secret** or intellectual property may withhold the name and/or CASRN/EC Number but must disclose ingredient/chemical role, amount and hazard score/class screen using either:
 3. **Greenscreen List Translator (LT)** score and/or Full GreenScreen Benchmark(BM)
 4. **The Globally Harmonized System** of Classification and Labeling of Chemicals rev.6 (2015) (GHS)
 - 1) The hazard screen must be applied to each trade secret ingredient and the inventory lists the hazard category for each of the health hazards included in Part 3 of GHS (e.g. "GHS Category 2 Carcinogen").
- HH. **Material Ingredient Optimization:** The end use product has demonstrated a product inventory and assessment of ingredients using any of the following programs:

1. **Manufacturer Inventory or HPD** (Health Product Declaration): The product has demonstrated a chemical inventory to at least 0.01% by weight (100ppm) and at least 95% by weight of product is assessed using GreenScreen Benchmark assessment. No Benchmark 1 hazards (BM-1) are present in the end use product. The remaining 5% by weight of product not assessed has been inventoried and screened using GreenScreen List Translator and no GreenScreen LT-1 hazards are present in the end use product. The documents must be third party verified.
 2. **Cradle to Cradle v3 certified** product with Material Health category score of Silver or higher, or a Cradle to Cradle certified Material Health Certificate at Silver level or higher.
- II. **Material Ingredient Screening and Optimization Action Plan:** The manufacturer has screened the product to at least 1,000 ppm and has provided a publicly available inventory meeting the requirements of Option 1 and completed a detailed action plan to mitigate or reduce known hazards using the principles of green chemistry. The action plan must be product-specific (not company, manufacturer or brand), and must include the following information:
1. Description of the screening or assessment platform used by manufacturer to complete the material ingredient screening and analysis.
 2. Identification of the specific green chemistry principles targeted for implementation in the action plan.
 3. Description of specific steps anticipated in implementation of the action plan. Include proposed changes in formulation or manufacturing processes that are planned as part of green chemistry optimization strategy.
 4. Specific dates and a full timeline for completion of all the steps described in the action plan.
- JJ. **Material Reuse:** Reuse includes salvaged, refurbished, or materials that remain in their original state repurposed for another function.
- KK. **Performance Green Building:** Built environments that integrates and optimizes all major and minor systems and attributes to exceed minimum standards and code such as energy and water, waste, indoor environmental quality, materials, durability, life-cycle performance, landscaping, land use, and occupant health and well-being. Built environments that are designed, constructed, operated, and maintained to create balance of economic viability, human health and well-being, and meaningful environmental stewardship.
- LL. **Product:** (permanently installed building product) An item that arrives on the project site either as a finished element ready for installation or as a component to another item assembled on-site. The product unit is defined by the functional requirement for use in the project; this includes the physical components and services needed to serve the intended function of the permanently installed building product. In addition, similar products within a specification can each contribute as separate products.
- MM. **Product Lens Certification:** An ingredient disclosure tool that provides hazard information in context, fulfilling new demands for product transparency and helping build trust in your brand. <https://www.ul.com/resources/product-lenstm-certification-program>
- NN. **Recycled Content:** Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
- OO. **Regional Material – Regionally Sourced:** Materials that have been extracted, harvested, recovered, manufactured, and/or purchased within **100 miles** of the Project site. When only a fraction of a product or material is extracted/ harvested/ recovered/ manufactured/ purchased and manufactured locally, then only that percentage (by weight) shall contribute to the regional value associated with LEED [Other] Materials and Resources credits and associated points. Refer to: Part 2: Products: 2.1: B: 5: Location Valuation Factor
- PP. **Reused Materials:** Products/materials that are more than one year old at the time of use. (If finishes are applied to salvaged or reused products/materials on-site, they must meet 'Low-Emitting' VOC emissions evaluation AND VOC content evaluation requirements.)
- QQ. **Salvaged - Reclaimed Material:** A material discarded, unused, obtained from existing deconstructed or demolished buildings. A material considered waste but has value as a building material. i.e. Coconut Palm

Trees. A salvaged material may maintain its original purpose or its original composition refurbished or repurposed.

- RR. **Service life:** the assumed length of time that a building, product, or assembly will be operational for the purposes of a life-cycle assessment.
- SS. **Solar Reflectance Index (SRI):** The measure of a constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation. SRI values range from zero (solid black surface) to 100 (solid white surface). SRI value of a material is calculated according to ASTM E1980 and based on the aged tested values of solar reflectance and thermal emittance.
1. Solar Reflectance (SR): Aged solar reflectance index measured in accordance with ANSI/CRRC S100. https://coolroofs.org/documents/ANSI-CRRC_S100-2016_Final.pdf
- TT. **Source Reduction:** A decrease in the amount of unnecessary material brought into a building in order to produce less waste. For example, purchasing products with less packaging is a source reduction strategy.
- UU. **Source Segregated Waste Stream:** Waste streams segregated on-site during the demolition and construction phases.
- VV. **Structure:** elements carrying either vertical or horizontal loads (e.g., walls, roofs, and floors) that are considered structurally sound and nonhazardous.
- WW. **TRACI: Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts.** <https://www.epa.gov/chemical-research/tool-reduction-and-assessment-chemicals-and-other-environmental-impacts-traci>
- XX. **Triple Bottom Line:** The equitable balance between Economic Viability, Social – Human Prosperity, Health, Well-being and Sound Environmental Stewardship. The tenets of Triple Bottom Line decision making are core components to performance green building, sustainability, resiliency, and the regenerative process.
- YY. **Universal Waste:** Hazardous items that are easily purchased and commonly used. Examples include batteries, pesticides, mercury-containing equipment, and light bulbs. See epa.gov/osw/hazard/wastetypes/universal/index.htm.
- ZZ. **USGBC Approved Program** – Products that comply with USGBC approved environmental product declaration frameworks.
- AAA. **Vertical Illuminance:** Illuminance levels calculated at a point on a vertical surface or plane.
- BBB. **VOC Emissions Evaluation:**
1. Product has been tested according to **California Department of Public Health (CDPH) Standard Method v1.21–20170** and complies with the VOC limits in Table 4-1 of the method. Additionally, the range of total VOCs after 14 days (336 hours) was measured as specified in the CDPH Standard Method v1.2 and is reported (TVOC ranges: 0.5 mg/m³ or less, between 0.5 and 5 mg/m³, or 5 mg/m³ or more). Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use. Products used in school classrooms must be evaluated using the classroom scenario, products used in other spaces must be evaluated using the default private office scenario.
 2. The statement of product compliance must include the **exposure scenario(s)** used, the amount of wet-applied product applied in mass per surface area (if applicable), the range of total VOCs, and follow guidelines in CDPH Standard Method v1.2-2017, Section Organizations that certify manufacturers' claims must be accredited under ISO Guide 17065. OR
 3. Product has been **tested according to EN 16516:2017** and complies with the LCI values from Table 1 of the German AgBB Testing and Evaluation Scheme (2015) and a formaldehyde limit of 10 micrograms per cubic meter. Additionally, the range of total VOCs after 28 days was measured as specified in EN 16516 and reported (TVOC ranges: 0.5 mg/m³ or less, between 0.5 and 5 mg/m³, or 5 mg/m³ or more). Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use

4. The statement of product compliance must include the **amount of wet-applied product** applied in mass per surface area (if applicable) and the range of total VOCs. Organizations that certify manufacturers' claims must be accredited under ISO Guide 17065.

CCC. **VOC Content Evaluation:**

1. Product meets the VOC content limits outlined in one of the applicable standards and for projects in North America, methylene chloride and perchloroethylene may not be intentionally added.
2. Statement of product compliance must be made by the manufacturer. Any testing must follow the test method specified in the applicable regulation. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.
3. **Paints and Coatings:**
 - a) California Air Resource Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings
 - b) South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016
 - c) European Decopaint Directive (2004/42/EC)
 - d) Hong Kong Air pollution control (VOC) Regulation for regulated architectural paints (January 2010)
4. **Adhesives and Sealants:**
 - a) SCAQMD Rule 1168, October 6, 2017
 - b) Canadian VOC Concentration Limits for Architectural Coatings (SOR/2009-264)
 - c) Hong Kong Air Pollution Control (VOC) Regulation for regulated adhesives and regulated sealants (April 2012)
 - d) Free of solvents, as defined in TRGS 610 (January 2011)
5. **Formaldehyde Emissions Evaluation:** Product meets one of the following:
 - a) EPA TSCA Title VI or California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or
 - b) EPA TSCA Title VI or CARB ATCM formaldehyde requirements for no added formaldehyde resins (NAF).
 - c) Tested per EN 717-1:2014 for formaldehyde emissions and complies with emissions class E1.
 - d) **Structural composite wood product** made with moisture resistant adhesives meeting ASTM 2559, no surface treatments with added urea-formaldehyde resins or coatings, and certified according to one of the following industry standards:
 - e) **Plywood:** compliant in accordance with Voluntary Product Standard - Structural Plywood (PS 1-09), Voluntary Product Standard – Performance Standard for Wood-Base Structural-Use Panels (PS 2-10), or one of the standards considered by CARB to be equivalent to PS 1 or PS 2: (AS/NZS 2269, EN 636 3S (including CE label), Canadian Standards Association CSA O121 for Douglas fir plywood, CSA O151 for Canadian softwood plywood, for CSA O153 Poplar plywood, or CSAO325 for Construction sheathing)
 - f) **Oriented strand board:** specified with the Exposure 1 or Exterior bond classification in accordance with Voluntary Product Standard – Performance Standard for Wood-Based Structural-Use Panels (PS 2-10)
 - g) **Structural composite lumber:** compliant in accordance with Standard Specification for Evaluation of Structural Composite Lumber Products (ASTM D 5456-13)
 - h) **Glued laminated timber:** compliant in accordance with Structural Glued Laminated Timber (ANSI A190.1-2012)
 - i) **I-joists compliant** in accordance with Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists (ASTM D 5055-13)

- j) **Cross-laminated timber:** Compliant in accordance with Standard for Performance-Rated Cross-Laminated Timber (PRG 320-15)
 - k) **Finger-jointed lumber labeled** "Heat Resistant Adhesive (HRA)" in accordance with the American Softwood Lumber Standard (DOC PS-20 2015)
6. **Furniture Emissions Evaluation:**
- a) Product has been tested in accordance with ANSI/BIFMA Standard Method M7.1–2011 (R2016) and . Complies with ANSI/BIFMA e3-2014e1 Furniture Sustainability Standard, Sections 7.6.1 (for half credit, by cost) OR 7.6.2 (for full credit, by cost). If 75% of the furniture also complies with Section 7.6.3 in addition to 7.6.2, the category counts for exemplary level(90%). Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.
 - b) Seating products must be evaluated using the seating scenario. Classroom furniture must be evaluated using the standard school classroom scenario. Other products should be evaluated using the open plan or private office scenario.
 - c) Statements of product compliance must include the exposure scenario(s). Organizations that certify manufacturers' claims must be accredited under ISO Guide 17065.

DDD. **Vertical Illuminance:** Illuminance levels calculated at a point on a vertical surface or plane.

EEE. **WaterSense®:** A voluntary partnership program sponsored by the U.S. Environmental Protection Agency (EPA). WaterSense is both a label for water-efficient products and a resource for water efficiency.

FFF. **WaterSense® Label:** WaterSense labeled products meet EPA's specifications for water efficiency and performance, and are backed by independent, third-party certification. Certifying organizations maintain the WaterSense label's integrity and credibility by verifying and testing products for conformance to WaterSense specifications, efficiency, performance, and label use, including periodic market surveillance.

GGG. **WaterSense Interactive Water Budget Tool:** (Irrigation)The WaterSense Water Budget Tool can be used to comply with section 4.1.1, Landscape Design or to ensure a measure of efficiency and regional suitability for the amount of water applied to a landscape based on local climate data.

- <https://www.usgbc.org/gallery/video/2765963/0>
- <https://www.epa.gov/sites/production/files/2017-01/documents/ws-homes-water-budget-approach.pdf>

1.6 DESIGN - PRE-CONSTRUCTION – CONSTRUCTION MEETINGS

- A. Design Development Conference: Conduct a 'full day' Sustainability - LEED Design Kick-off Charrette at the Project site, Architect, Design Builder offices or other 'before' Design Development begins. Additional multiple or extended length meetings may be required during the course of Design Development and Construction Document phases. Review sustainability, LEED, WELL, and other pertinent design, requirements to achieve LEED v4 – v4.1 certification including LEED v4.1 credit: IPc1: Integrative Process. Review prerequisite, YES, MAYBE, NO identified credit requirements and the strategies required for achievement, responsible parties, deadlines, and required verification documentation, calculations, and action plans.
- B. Pre-Construction Conference: Conduct a Sustainability - LEED construction kick-off Charrette at the Project site, Architect, Design Builder offices or other 'before' construction begins. Additional multiple or extended length meetings may be required during the course of Construction phases. Review sustainability, LEED, WELL, and other pertinent construction, requirements, and education to achieve LEED v4 – v4.1 certification.
- C. [ADMINISTRATIVE POLICY & PROCUREMENT Author, Develop, Implement 'Sustainable Meetings Policy – Plan': Consider:
 - 1. Minimize Printing: Provide digital documents via email, server, projector.

2. When printing:
 - a) Print Double-sided
 - b) Set printer for minimal toner use
 - c) [Use sustainable – toner and energy efficient fonts, minimize font size.
 - Century Gothic
 - Courier
 - Ryman Eco
 - EcoFont
 - Brush Script
 - Tips: <https://www.companyfolders.com/blog/5-ink-saving-eco-fonts>]
3. Design Builder – SubDesign Builder Administration Offices – On-Site – Site Staging Areas Considerations: As part of LEED v4.1 MRp2: Construction Waste Management Plan (CWMP). Ensure all consumer waste materials are recycled properly recycled and does not contaminate site/source segregated demolition and construction waste streams, including commingled waste streams. Ensure Organic Waste - Food Waste - Papers, Plastics, Cardboard, Metals, Glass, e-waste, hazardous waste, etc. are segregated for proper disposal, recycling, reuse, composting, salvage.
 - a) Food – Organic Waste: Donate, compost, properly store, etc.
 - b) Provide feedback survey to attendees to gain feedback for future meetings.
 - c) [Ensure proper ventilation for high-occupancy spaces when meetings are underway.]
 - d) [Construction Office Trailers: Temporary Buildings: Perform due-diligence activities to maximize energy-water efficiency, indoor environmental quality, safety, disaster preparedness, cleanliness, and productivity. Ensure:
 - HVAC equipment is functioning properly.
 - Water Fixtures are WaterSense Labeled or equivalent.
 - Are outfitted with maximized insulation for perimeter walls, roof, and floor.
 - Has personnel assigned to manage operational protocols for weekly [frequent] ventilation filtration media change-out, sanitation, cleanliness, proper consumer waste recycling and organic waste disposal,
 - Minimize use of mercury containing luminaires while maximizing use of LED luminaires.
 - Ensure uniform lighting color temperature (Approx. 5600k)
 - Ensure each workstation is equipped with user adjustable task lighting.
 - Ensure no smoking – use of electronic smoking devices are prohibited.
 - If smoking areas are permitted, that they be at least 50 feet from any ventilation systems, fenestration, and are clearly marked equipped with cigarette disposal containers.]

- D. [ADMINISTRATIVE POLICY & PROCUREMENT: Green Procurement Policy and Recycle Content Paper]
 1. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identifygreener-products-and-services for products and their minimum required content levels.
 2. Purchase green products to maximum amount feasible, for general day-to-day administration office use. i.e. Energy Star Computers and Office Equipment, Copiers, etc.
 3. For all office paper purchased for routine daily business administration and operations ensure purchased paper has a Post-Consumer Recycled content of a minimum of 30%, [with a goal of [50%] [100%].
 4. Ensure office workstations are provided with recycling bins to accommodate segregated or commingled materials.
 - a). Ensure large [60+ gallon wheeled] recycle bins are available and easily accessible to deposit materials from workstations, segregated or commingled maximizing diversion from landfill.
- E. Conduct ongoing LEED IPc1: Integrative Process meeting(s) as outlined under LEED v4.1. See below for Guidance – Information for meeting requirements and criteria.
 - <https://www.usgbc.org/node/2613097?view=language>

- <https://www.usgbc.org/gallery/video/4370005/0>
- <https://www.usgbc.org/gallery/video/4370026/0>
- Refer to the 'Integrative Process: ANSI Consensus National Standard Guide, February 2, 2012
(http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/15/15%20IP%20Standard%20Guide%20-%20FINAL%20APPROVED%202-1-12.pdf)

1.7 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect, Engineers, User Agency, Facilities Management, Sustainability Consulting Professional, and/or the GBCI/USGBC reviewers regarding LEED v4 - v4.1 BD+C NC prerequisites and credits that are the responsibility of the Design Builder. This includes, but it not limited to: product selection, product quality, environmentally preferable product (EPP) characteristics, product/system installation, acquisition, extraction, manufacturing locations, or procedures. The Design Builder shall respond to requests until GBCI/USGBC has made their determination(s) on Project's LEED third-party verified performance green building certification application.
- B. Submit – provide material, product, system verification documentation submittals to GBCI [through the LEED Online verification documentation portal and] User Agency's LEED Accredited [Sustainability] Professional responsible for the overall LEED certification process. Respond to questions and requests from all organizations with respect to LEED prerequisites and/or credits that are the responsibility of the Design Builder and depend on product selection, EPP characteristics, and/or product qualities, and/or Design Builder's procedures until GBCI has made their final determination(s) on the Project's LEED third-party verified performance green building certification application.
- C. Materials and Resources, Systems, Assemblies, Verification Documentation Forms includes but is not limited to:
 1. Date of purchase
 2. Product Name – ID number and or Model number
 3. Purpose and Use in the Project
 4. Project's Total actualized cost of individual item, system, or assembly.
 5. Project's Total approximate - estimated cost of each item.
 6. Supply – Distribution Vendor: Name, address, phone, email, contact. Located within 100 miles?
 7. Raw Material Extraction point, Manufacturer Manufacturing Procedures and Processes: Name, address, phone, email, contact. Located within 100 miles?
 8. Manufacturer: Name, address, phone, email, contact. Located within 100 miles?
 9. Material Ingredients or Formulation
 10. Product Type: Raw Material, Assembly, System, Homogenous Material
 11. Recycled Content: Post-Consumer and Pre-Consumer
 12. Environmental Product Declaration – Type
 13. Manufacturer Declaration
 14. Third-Party Certification Type – Level
 15. Other product declaration
- D. Document correspondence with GBCI/USGBC [and/ or other] as informational submittals.
- E. Product, Material, System, Assembly Forms shall be submitted in a timely manner coinciding construction phase: The Design Builder shall provide completed forms as complete data becomes available. Typically structural steel and concrete data becomes available prior to mid-construction when cost information is required.

2.8 ACTION SUBMITTALS – MATERIALS - ENVIRONMENTALLY PREFERRABLE PRODUCTS (EPPs)

- A. Requirements in this article assume that product data and cost information are submitted to the Architect [and Sustainability Accredited Professional] [LEED Coordinator] for approval.
1. Approved submittals include documentation needed to verify compliance with LEED v4 - v4.1 requirements, so that Architect or User Agency can be assured when filling out the online forms that requirements have been met.
- B. General: Submit additional sustainable design submittals required by other Sections. Applicable to LEED v4 - v4.1 NC
- C. Sustainable design submittals are in addition to and completely separate from other submittals.
1. Submittals in "Sustainable Design Documentation Submittals" the below is required to verify compliance with project selected (indicated by the LEED v4 – 4.1 scorecard's Yes and Maybe identified credits.) Additional submittals WILL be required in other Sections.
 - a) **Do not include** Shop-Drawings, Installation Instructions, or other data 'unrelated' to, or 'irrelevant' to sustainability or LEED Certification.
 - b) **Include** EPP, Materials and Resources or Low-Emitting criteria or requirements.
 2. If submitted item is identical to that proposed to comply with other requirements, include additional copy with other submittal as a record of compliance with indicated LEED requirements instead of separate sustainable design submittal.
 - a) Mark additional copy "Sustainable Design Submittal." Or "LEED Submittal"
 3. The Design Builder is to provide clear and legible, digital document submittals (including resubmittals), with content driven, date of transmittal file naming protocol.
 - a) (Example:ProjectX_IconSteel_SustainableProduct_resubmittal_Sept282019) verification documentation attesting to the criteria of materials and resources, low-emitting environmentally preferable characteristics.
 4. The Design Builder's or Sub-Design Builder's Sustainability Accredited Professional shall provide a complete and properly prepared single page digital form that shall be provided by the Design Builder or Sustainability Accredited Professional, or Sustainability – LEED Consulting firm.
 - a) This 'form' shall list the EPP (Environmentally Preferable Product) attributes of each product (See PART 5 PRODUCT IDENTIFICATION) - material submittal as applicable criteria and requirements.
 - b) The form shall list one or more of the following attributes: Final project cost for the item, Product Brand/Manufacturer, Product Manufacturer's ID Name and/or number, EPP Attribute(s), point of purchase, distribution vendor, manufacturer location, point of extraction location, manufacturer or product declaration, subDesign Builder, individual responsible for completing the form and submittal with phone, email, mobile phone contact information, Date, Original/first submittal – Resubmittal, and other pertinent information regarding the item's qualities,
- D. Sustainable Design Documentation Submittals: Per applicability to pursued credits outlined in the LEED v4 - v4.1 NC Checklist/Scorecards.
1. Documentation for luminaires indicating BUG ratings, lumens emitted, and vertical illuminance values.
 2. Documentation for compliant paving materials indicating the SRI, SR, and...
 - a) Porosity, permeability, infiltration factor.
 3. Documentation for roofing materials and/or coatings indicating the SRI, 3 Year SR.
 4. Product Data and certification for WaterSense-labeled interior water fixtures.
 - a) Fixture Operation factors: Sensor, power supply, set-point(s)
 5. Product Data for plumbing fixtures indicating flush or flow rate.
 6. Documentation complying with Section [01 91 13] "General Commissioning Requirements," Section 01 91 19.43 "Exterior Enclosure Commissioning," Section 210800
 7. "Commissioning of Fire Suppression," Section [22 08 00] "Commissioning of Plumbing," "Commissioning of HVAC," and Section 26 08 00 "Commissioning of Electrical Systems."

- a) [Additional systems to be commissioned]

PART 3 - Products

BUILDING LIFE-CYCLE IMPACT REDUCTION LEED v4 [v4.1] NC MRc1: Building Life-Cycle Impact Reduction: **The adaptive reuse and optimize the environmental performance of products and materials.**
https://s3.amazonaws.com/usgbc_source_videos/lca/index.html

- A. Whole-Building Life-Cycle Assessment: For new construction (buildings or portions of buildings), conduct a life-cycle assessment of the project's structure and enclosure and select one or more of the following:
Path 1: Conduct a life cycle assessment of the project's structure and enclosure.
- B. Path 2: Conduct a life cycle assessment of the project's structure and enclosure that demonstrates a minimum of 5% reduction, compared with a baseline building in at least three of the six impact categories listed below, one of which must be global warming potential.
- C. The baseline and proposed buildings must be of comparable size, function, orientation, and operating energy performance as defined in EA Prerequisite Minimum Energy Performance. The service life of the baseline and proposed buildings must be the same and at least 60 years to fully account for maintenance and replacement. Use the same life-cycle assessment software tools and data sets to evaluate both the baseline building and the proposed building, and report all listed impact categories. Data sets must be compliant with ISO 14044.

MATERIALS: BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

- A. Documentation for LEED BD+C NC v4.1: BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION: MRc2 Environmental Product Declarations (EPDs) complying with LEED v4.1 BD+C NC - New Construction requirements.
- B. **Option 1: Performance Path: Environmental Product Declaration (EPD):** LEED v4.1 BD+C NC: Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria.
(Please see PART 5: PRODUCT IDENTIFICATION and definitions)

Life-cycle assessment and environmental product declarations.

- Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
- Product-specific Type III EPD -- Internally Reviewed. Products with an internally critically reviewed LCA in accordance with ISO 14071. Products with product-specific internal EPDs which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
- Industry-wide Type III EPD -- Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. Products with industry-wide EPDs, which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.

Environmental Product Declarations which conform to ISO 14025 and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification and external critical review in which the

manufacturer is explicitly recognized as the participant by the program operator are valued as 1.5 products for the purposes of credit achievement calculation.

AND/OR

A. Option 2: Prescriptive Path: Multi-attribute optimization requirements.

1. Use products that comply with one of the criteria below for 10%, by cost, of the total value of permanently installed products in the project, or use at least 10 permanently installed products sourced from at least three different manufacturers.
 - a) Life Cycle Impact Reduction Action Plan (value at 50% by cost or ½ product): The manufacturer has produced a product specific LCA using EN 15804 or ISO 21930 for the product and has provided a publicly available action plan to mitigate or reduce life cycle impacts. The action plan must be product-specific using the specified PCR functional unit, be critically reviewed, and must include the following information:
 - b) Description of the LCA conducted including the dataset, software or platform used by manufacturer to complete the analysis.
 - c) Identification of the largest life cycle impact areas identified in the analysis and a narrative description of the impact areas targeted for reduction in the action plan.
 - d) Description of specific steps anticipated in implementation of the action plan. Include proposed changes in formulation or manufacturing processes that are planned as part of impact reduction strategy.
 - e) Specific dates and a full timeline for completion of all the steps described in the action plan.
2. Life Cycle Impact Reductions in Embodied Carbon: Products that have demonstrated environmental impact reductions for the specified functional unit based on a current third-party EPD or verified LCA that conforms to the comparability requirements of ISO 14025 and ISO 21930.
 - a) The comparative analysis must show impact reduction in the global warming potential (GWP) impact category and must include a narrative describing how reductions in impacts were achieved. The published comparisons must be third-party verified (value at 100% by cost or 1 product).
 - b) The comparative analysis must show impact reduction(s) of at least 10% in the global warming potential (GWP) impact category and must include a narrative describing how the impact reductions were achieved. The published comparisons must be third-party verified (value at 150% by cost or 1.5 products).
 - c) The comparative analysis must show impact reduction(s) of at least 20% in the global warming potential (GWP) impact category, and demonstrate at least 5% reduction in two additional impact categories. A narrative describing how the impact reductions were achieved is required. The published comparisons must be third-party verified (value at 200% by cost or 2 products). Impact Categories:
 - Global warming potential (greenhouse gases), in CO₂e;
 - Depletion of the stratospheric ozone layer, in kg CFC-11e;
 - Acidification of land and water sources, in moles H⁺ or kg SO₂e;
 - Eutrophication, in kg nitrogen equivalent or kg phosphate equivalent;
 - Formation of tropospheric ozone, in kg NO_x, kg O₃ eq, or kg ethene; and
 - Depletion of nonrenewable energy resources, in MJ (using CML) / depletion of fossil fuels in TRACI.
3. USGBC approved program -- Products that comply with other USGBC approved multi-attribute frameworks.
4. For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles of the project site are valued at twice their base contributing cost (or number of products), up to a maximum of 200% of their base contributing cost or 2 products.
 - a) Include documentation for any applicable third-party certifications and/or designations.]

D. Documentation for LEED BD+C NC v4.1: BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION: MRc3 for Sourcing of Raw Materials requirements: **Responsible Sourcing of Raw Materials:** (Please see PART 5: PRODUCT IDENTIFICATION and definitions)

1. **Option 1:** Use products sourced from at least three different manufacturers that meet at least one of the responsible sourcing and extraction criteria for at least 20%, by cost, of the total value of permanently installed building products in the project.
2. **Option 2:** Use products sourced from at least five different manufacturers that meet at least one of the responsible sourcing and extraction criteria for at least 40%, by cost, of the total value of permanently installed building products in the project]
 - a) **Extended producer responsibility:** Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility. Products meeting extended producer responsibility criteria are valued at 50% of their cost.
 - b) **Bio-based materials:** Bio-based raw materials other than wood must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material.
 - Bio-based products that meet the criteria above: value at 50% of cost multiplied by the biobased content of the product calculations.
 - Bio-based products that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard: value at 100% of cost multiplied by the biobased content of the product for calculations
 - c) **Wood products:** Wood products must be certified by the Forest Stewardship Council (FSC) or USGBC-approved equivalent.
 - d) Products meeting wood products criteria are valued at 100% of their cost for calculations.
 - e) **Materials reuse:** Reuse includes salvaged, refurbished, or reused products. Products meeting materials reuse criteria are valued at 200% of their cost for calculations.
 - f) **Recycled content:** Products meeting recycled content criteria are valued at 100% of their cost for calculations.
 - Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on weight.
 - The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
3. USGBC approved program: Other USGBC approved programs meeting responsible sourcing and extraction criteria.
4. **Products sourced (extracted, manufactured, purchased) within 100 miles** of the project site are valued at twice their base contributing cost (or number of products), up to a maximum of 200% of their base contributing cost or 2 products.

E. Documentation for LEED BD+C NC v4.1: BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION: MRc4 LEED v4.1 requirements for **Material Ingredients:** (Please see PART 5: PRODUCT IDENTIFICATION and definitions)

1. **Option 1: Material Ingredient Reporting: LEED v4.1 BD+C NC:** Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).
 - a) **Manufacturer Inventory:** The manufacturer has published complete content inventory for the product following these guidelines:
 - b) A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN) and/or European Community Number (EC Number).
 - c) Materials defined as trade secret or intellectual property may withhold the name and/or CASRN/EC Number but must disclose ingredient/chemical role, amount and hazard score/class using either:

- Greenscreen List Translator (LT) score and/or Full GreenScreen Benchmark (BM)
- The Globally Harmonized System of Classification and Labeling of Chemicals rev.6 (2015) (GHS)
 - The hazard screen must be applied to each trade secret ingredient and the inventory lists the hazard category for each of the health hazards included in Part 3 of GHS (e.g. "GHS Category 2 Carcinogen").
- d) **Health Product Declaration:** The end use product has a published, and complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
- e) **Cradle to Cradle:** Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Bronze level or higher.
- f) **Declare:** Declare product label must meet the following requirements: 1. Declare labels designated as Red List Free or Declared. 2. Declare labels designated as LBC Compliant that demonstrate content inventory to 0.1% (1000 ppm).
- g) **Living Product Challenge:** The included Declare product label must demonstrate content inventory to 0.1% (1000 ppm).
- h) **ANSI/BIFMA e3 Furniture Sustainability Standard.** The documentation from the assessor or scorecard from BIFMA must demonstrate the product earned at least 3 points under 7.5.1.3 Advanced Level in e3-2014 or 3 points under 7.4.1.3 Advanced Level in e3-2012.
- i) Product Lens Certification
- j) **Facts – NSF/ANSI 336:** Sustainability Assessment for Commercial Furnishings Fabric at any certification level.
- k) USGBC approved program. Other USGBC approved programs meeting the material ingredient reporting criteria.

! Any compliant reports above with third-party verification that includes the verification of **content inventory** are worth 1.5 products for credit achievement calculations.

AND/OR

2. **Option 2: Material Ingredient Optimization:** Use permanently installed products from at least three different manufacturers that document their material ingredient optimization using the paths below. Choose either 10 compliant products, or select products that constitute at least 10%, by cost, of the total value of permanently installed products in the project.
 - a) **Material Ingredient Screening and Optimization Action Plan** (value at 50% by cost or ½ product): The manufacturer has screened the product to at least 1,000 ppm and has provided a publicly available inventory meeting the requirements of Item H. 1. [H. 2.] above and completed a detailed Action Plan to mitigate or reduce known hazards using the principles of green chemistry. The Action Plan must be product-specific (not company, manufacturer or brand), and must include the following information:
 - Description of the screening or assessment platform used by manufacturer to complete the material ingredient screening and analysis.
 - Identification of the specific green chemistry principles targeted for implementation in the action plan.
 - Description of specific steps anticipated in implementation of the action plan. Include proposed changes in formulation or manufacturing processes that are planned as part of green chemistry optimization strategy.
 - Specific dates and a full timeline for completion of all the steps described in the action plan.
3. **Advanced Inventory & Assessment** (value at 100% by cost or 1 product): The end use product meets the requirements of any of the following:

- a) **Manufacturer Inventory or Health Product Declaration:** The product has demonstrated a chemical inventory to at least 0.01% by weight (100 ppm) with no GreenScreen LT-1 hazards or GHS Category 1 hazards. The HPD or Manufacturer Inventory must be third party verified.
 - b) **Manufacturer Inventory or HPD:** The product has demonstrated a chemical inventory to at least 0.01% by weight (100ppm) and at least 75% by weight of product is assessed using GreenScreen Benchmark assessment.
 - The remaining 25% by weight of product has been inventoried. The GreenScreen assessment must be publicly available. The HPD or Manufacturer Inventory must be third-party verified.
 - c) **Declare labels designated as Red List Free** that are third-party verified, or Living Product Challenge certified products that include a Red List Free Declare label.
 - d) **Cradle to Cradle:** Product has Material Health Certificate or is:
 - Cradle to Cradle Certified™ under standard version 3 or later with a
 - Material Health achievement level at the Bronze level or higher.
4. **Material Ingredient Optimization:** value at 150% by cost or 1.5 products: The end use product meets the requirements of any of the following programs: (Please see PART 5: PRODUCT IDENTIFICATION and definitions)
- a) **Manufacturer Inventory or HPD:** The product has demonstrated a chemical inventory to at least 0.01% by weight (100ppm) and at least 95% by weight of product is assessed using GreenScreen Benchmark assessment.
 - b) **No Benchmark 1 hazards (BM-1)** are present in the end use product. The remaining 5% by weight of product not assessed has been inventoried and screened using GreenScreen List Translator and no GreenScreen LT-1 hazards are present in the end use product.
 - c) The documents must be third-party certified.
 - d) **Cradle to Cradle v3** certified product with Material Health category score of Silver or higher, or a Cradle to Cradle certified Material Health Certificate at Silver level or higher.
 - e) **Living Product Challenge.** Products certified to the Living Product Challenge which includes achievement of Imperative 09: Transparent Material Health.
 - f) **[International Alternative Compliance Path – REACH Optimization:** value at 100% of cost or 1 product.
 - g) **End use products and materials** have fully inventoried chemical ingredients to 100 ppm and assess each substance against the Authorization List – Annex XIV, the Restriction list – Annex XVII and the SVHC candidate list, (the version in effect June 2013,) proving that no such substance is included in the product. If the product contains no ingredients listed on the REACH Authorization, Restriction, and Candidate list.]
5. **Global Green Tag International:** product has a certified Product Health Declaration (PhD) report. Value at 100% or 1 product.]
6. **USGBC approved program:** Products that comply with USGBC approved building product optimization criteria for material ingredient optimization and/or advanced inventory & assessment pathways.
7. **Products sourced (extracted, manufactured, purchased) within 100 miles** of the project site are valued at twice their base contributing cost (or number of products), up to a maximum of 200% of their base contributing cost or 2 products.

LOW-EMITTING MATERIALS

- A. Documentation for LEED Indoor Environmental Quality IEQc2 v4.1 - v4 Low-Emitting Materials: As defined below Eight (8) Categories: Use materials on the building interior. Everything within the waterproofing membrane that meet the low-emitting criteria below with respect to category:
- a) Two Project Categories
 - b) Three Project Categories
 - c) Four Project Categories
 - d) Five Project Categories
 - e) Reach 90% threshold in at least three product categories for Exemplary Performance OR
 - f) One additional LEED IEQc2 point if Two Categories or Three Categories are achieved.
- Refer to Definitions:
1. VOC Emission Evaluation (BBB)
 2. VOC Content Evaluation (CCC)
 3. Inherently Nonemitting (BB)
 4. Salvaged (QQ)
 5. Reused (PP)

EIGHT CATEGORIES:

- B. **Paints and Coatings:** Category 1 of 8: At least 75% by volume or surface area, meet the VOC emissions evaluation AND 100% meet the VOC content evaluation.
1. The paints and coatings product category includes all interior paints and coatings applied on site.
- C. **Adhesives and Sealants:** Category 2 of 8: At least 75% of all adhesives and sealants, by volume or surface area, meet the VOC emissions evaluation AND 100% meet the VOC content evaluation
1. The adhesives and sealants product category includes all interior adhesives and sealants applied on site.
- D. **Flooring:** Category 3 of 8: At least 90% of all flooring, by cost or surface area, meets the VOC emissions evaluation OR
1. Inherently nonemitting sources criteria, (See Definitions) OR
 2. Salvaged and reused materials criteria. (See Definitions)
 3. The flooring product category includes all types of hard and soft surface flooring (carpet, ceramic, vinyl, rubber, engineered, solid wood, laminates), wall base, underlayment, and other floor coverings
 4. - Subflooring is excluded.
- E. **Wall panels:** Category 4 of 8: At least 75% of all wall panels, by cost or surface area, meet the VOC emissions evaluation:
1. OR inherently nonemitting sources criteria, OR
 2. Salvaged and reused materials criteria.
 3. The wall panels product category includes all finish wall treatments (wall coverings, wall paneling, wall tile), surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, doors, frames, windows, and window treatments.
 4. - Removable/interchangeable fabric panels, built-in cabinetry, and vertical structural elements are excluded.
- F. **Ceilings:** Category 5 of 8: At least 90% of all ceilings, by cost or surface area, meet the VOC emissions evaluation,
1. OR inherently nonemitting sources criteria,
 2. OR salvaged and reused materials criteria.

3. The ceilings product category includes all ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights.
 4. - Overhead structural elements (exposed, finished, and unfinished) are excluded.
- G. **Insulation:** Category 6 of 8: At least 75% of all insulation, meets the VOC emissions evaluation.
5. The insulation material category includes all thermal and acoustic boards, batts, rolls, blankets, sound attention fire blankets, foamed-in place, loose-fill, blown, and sprayed insulation.
 6. - Insulation for HVAC ducts and plumbing piping are excluded.
- H. **Furniture:** Category 7 of 8: At least 75% of all furniture in the project scope of work, by cost, meets the VOC emissions evaluation, (See Definitions) OR
1. Inherently nonemitting sources criteria, OR salvaged and reused materials criteria.
 2. The furniture product category includes all stand-alone furniture items purchased for the project.
- I. **Composite Wood:** Category 8 of 8: At least 75% of all composite wood, by cost or surface area, meets the Formaldehyde emissions evaluation (See Definitions) OR
1. Salvaged and reused materials criteria.
 2. Composite wood product category includes all particleboard, medium density fiberboard, hardwood veneer plywood, and structural composite wood.
 - a) Not already included in the flooring, ceiling, wall panels, or furniture material categories.

WELL STANDARD CREDITS

- A. Fundamental Air Quality: Meet Thresholds for Air Particulate Matter (A01.1) For All Spaces except Commercial Kitchen Spaces: The following thresholds are met:
- 1) PM2.5 less than 15 µg/m³.
 - 2) PM10 less than 50 µg/m³
 - 3) For All Spaces except Commercial Kitchen Spaces
2. The following thresholds are met for a project located where the annual average ambient PM2.5 level is 35 µg/m³ or higher.
- 1) PM2.5 less than 25 µg/m³.
 - 2) PM10 less than 50 µg/m³.
- OR-----
3. The following thresholds are met for a project located where the annual average ambient PM2.5 level is 35 µg/m³ or higher.
- 1) PM2.5 equal to 30% of the 24- or 48-hour average of outdoor levels on the day(s) of performance testing.
 - 2) PM10 equal to 30% of the 24- or 48-hour average of outdoor levels on the day(s) of performance testing.
- B. Implement Air Particle Filtration A12.1: Mechanically and Mixed-mode ventilated spaces: The following requirement is met:
1. Media filters are used in the ventilation system to filter outdoor air supplied to the space in accordance with thresholds specified in the table below:

a)	Annual Average Outdoor PM2.5 Threshold: Minimum Air Filtration Level	
	16 µg/m ³ or less	MERV 8 or G4
b)	17–18 µg/m ³	MERV 10 or M5
c)	19–23 µg/m ³	MERV 12 or M6

- | | | |
|----|---------------------------------|---|
| d) | 24–39 µg/m ³ | MERV 14 or F8 |
| e) | 40–59 µg/m ³ | MERV 16 or E10 |
| f) | 60 µg/m ³ or greater | MERV 16 preceded by MERV 8, or E10 preceded by G4 |

2. Filter is equipped with on-board pressure sensors or filter change indicator that signal when filter requires replacement. Evidence that the filter has been replaced according to manufacturer's recommendation.

C. **Microbe and Mold Control: Manage Condensation and Mold (A12.2):** Condensation management

1. A narrative describes how condensation is addressed for the project, considering the following:
 - a) High interior relative humidity levels, particularly in susceptible areas like laundry rooms, below-grade spaces and other high-humidity areas.
 - b) Air leakage that could wet either exposed interior materials or interstitially hidden materials.
 - c) Cold surfaces such as basements, slab-on-grade floors or the inside of exterior walls.
 - d) Oversized air conditioning units.
2. **Mold inspections:** The following requirements are met:
 - a) Annual inspections for signs of water damage or pooling, discoloration and mold on ceilings, walls and floors is performed by a professional demonstrated not to have a conflict of interest. The report is submitted annually to Quincy Facilities O+M.
 - b) One of the below is met:
 - Project achieves cooling coil mold reduction as per Part 1: Implement Ultraviolet Air Treatment.
 - All cooling coils (where applicable) are inspected on a quarterly basis for mold growth and cleaned if necessary. Dated photos demonstrating adherence are submitted annually through WELL Online.
 - 2) For projects with tenants, there is a system in place for notifying building management about mold or water damage and addressing concerns.

D. **Fundamental Water Quality: Meet Water Sediment Thresholds (W01.1):** Water delivered to the project for human consumption, handwashing and showers/baths meets the following threshold:

- 1) Turbidity less than or equal to 1.0 NTU

E. **Fundamental Water Quality: Meet Microorganisms Thresholds:** Water delivered to the project for human consumption, handwashing and showers/baths meets the following requirement:

- 1) Contains 0 CFU / 100 mL total coliforms (including E. coli).

F. **Legionella Control (W03.1):** Author a narrative describing how the building addresses Legionella, and includes the following:

- 1) Formation of a team for Legionella management in the building.
- 2) Water system inventory and production of process flow diagrams.
- 3) Hazard analysis of water assets.
- 4) Identification of control points and measures.
- 5) Monitoring actions to ensure control measures are within performance limits and determining corrective actions.
- 6) Verification and validation procedures.
- 7) Documentation of the plan and its implementation.

- G. Sound Mapping: Manage Background Noise Level (SO1.1): Projects meet at least one of the following requirements to address background noise levels:
 - 1) An annotated document is provided that indicates the projected background noise level (dBA or NC) attributable to HVAC equipment noise, external noise intrusion or a similar source (e.g., a floor plan is color-coded to indicate dBA levels between regularly occupied spaces or across façade elements).
 - 2) A professional narrative is provided that indicates the measured background noise level (dBA or NC) attributable to HVAC equipment noise, external noise intrusion or a similar source in each space as denoted in Feature S02: Maximum Noise Levels.
- H. Sound Mapping: Manage Acoustical privacy (SO1.2): Projects meet at least one of the following requirements to address acoustical privacy:
 - 1) An annotated document is provided that indicates the projected acoustical performance of typical walls that separate regularly occupied spaces throughout the project (e.g., STC/Rw, NIC/Dw or equivalent sound transmission metrics denoted on a partition schedule from an architectural drawing set).
 - 2) A professional narrative is provided that indicates the measured level of acoustical privacy between regularly occupied spaces or within open workspace environments (e.g., NIC/Dw (or equivalent) or SPP data across partitions).

EXECUTION

5.1 Comply with Section 01 74 19 "Construction Waste Planning and Management."

4.1 NON-SMOKING BUILDING [– NON-SMOKING SITE]

- A. Develop and implement a 'No Smoking Policy' for the Project Site, Project Building(s), [Project Related Administration Areas]. The 'No Smoking Policy' shall pertain to environmental tobacco smoke, as well as smoke produced from the combustion of cannabis and controlled substances in addition to the emissions produced by electronic smoking devices.
 - 1. Prohibit smoking outside the building except in designated smoking areas located at least 25 feet [50 feet] (or the maximum extent allowable by local code) from all entries, outdoor air intakes, and operable windows.
 - a) This smoking requirement also applies to any spaces outside the property line [Limit of Construction] [Project Boundary] that are used for business, project administration, and any project related activities.
 - 2. The 'No Smoking Policy' shall be conveyed, communicated to all individuals working or visiting areas associated with construction [project] activities.
 - 3. The 'No Smoking Policy' shall include education protocols, signage, and a clear boundary demarcation as applicable.
 - 4. When 'designated smoking areas' are necessary, each area shall be clearly marked, equipped with the adequate quantity and type of tobacco, cigarette disposal containers, worker consumer segregated and/or commingled recycling bins, including organic waste.
 - a) Designated personnel shall be tasked to manage and maintain designated smoking areas. Tasks may include relocation during construction phases, properly disposing of waste, maintaining signage and perimeter demarcation practices, policing, and educating personnel.
 - 5. [Personnel shall be offered a smoking cessation program, free of charge.]

4.2 CONSTRUCTION INDOOR AIR QUALITY PLANNING AND MANAGEMENT

- A. **Construction Indoor Air Quality Management Plan (IAQMP):** Comply with LEED v4.1 IEQc3: Construction Indoor Air Quality Management Plan: Prior to the commencement of building enclosure

construction, develop then implement an Indoor Air Quality Management Plan (IAQMP) for the construction and preoccupancy [and occupancy] phases of the project building(s). The IAQMP must address all of the following:

1. **During construction, meet or exceed all applicable** recommended control measures of the Sheet Metal and Air Conditioning National Design Builders Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3, including:
 - a) **Protect absorptive materials** stored on-site and installed from moisture damage.
 - b) **Do not operate permanently installed air-handling equipment during construction** unless filtration media with a minimum efficiency reporting value (MERV) of 8, as determined by ASHRAE 52.2–2017 with errata (or equivalent media with ISOcoarse or higher, as defined by ISO 16890-2016 Particulate Air Filters for General Ventilation, Determination of the Filtration Performance) are installed at each return air grille and return or transfer duct inlet opening (supply and return) such that there is no bypass around the filtration media.
 - c) If temporary, non-permanently installed air-handling equipment is used the above criteria is to be used throughout construction.
 - d) **Immediately before occupancy**, replace all filtration media with the final design filtration media (MERV 13 or higher) installed in accordance with the manufacturer's recommendations.
2. **Provide Media Change-out Log Data:** The Design Builder is to provide verification documentation of filtration media change-out during construction and prior to occupancy [and during occupancy] whether permanently or non-permanently installed air-handling equipment is in use during construction.
 - a) Media Type – MERV/ISO
 - b) Filtration Manufacturer Data
 - c) Time – Date – location
 - d) Personnel Responsible for Media Change
3. **Design Builder is to increase media change-out frequency** during periods that generate high quantities of airborne particulate, such as concrete cutting and drywall cutting, installation, and sanding.
4. **The Design Builder is to provide clearly legible**, digital document submittals, with content driven, date of transmittal file naming protocol verification documentation attesting to Indoor Air Quality Management Plan (IAQMP) implementation:
 - a) File name examples:
 - Project_LEED_MERV_Cutsheet_Sept28 2020.pdf
 - Project_LEED_Installation_Company_Log_Sept28_2020.pdf
 - Project_LEED_Vendor_Product_Cutsheet_Sept 28_2020.pdf

B. IAQMP Construction Documentation:

1. The Design Builder is to provide at a minimum: Six 'annotated' photographs at three different times during the construction period depicting IAQMP implemented strategies.
 - a) Photographs shall be 'annotated' with precise on-site location, Date/time, Photographer, subject, note of compliance or note of non-compliance and report of such to whom.
 - Provide photographic report with associated plan-sheet location detail. (Bluebeam or other) when possible.
2. A written narrative description of the IAQMP strategy(ies) employed, documenting implementation of the IAQ management measures:
3. Protection of air-handlers, ventilation, distribution ducts, and associated systems:
 - a) Visually inspect upon arrival on Site
 - b) Storage in clean, particulate free, weather protected areas in or outside the building envelope.
 - c) Stored or partially installed within the building envelope
 - d) Installed within the building envelope

- e) Prior to system – zone start-up
- f) Visual Inspections: Upon inconsistencies, damage, significant particulate, lubrication leakage or other is apparent, provide General photographic record with annotations and associated report record.
- 2) Protection of Absorptive Materials: i.e. Doors, Ceilings, Drywall, Woods, etc.
 - a) Visually inspect upon arrival on-site
 - b) Storage areas must clean, particulate free, weather protected containers. Materials must be segregated from heavy use of construction vehicles and areas where vehicle fueling takes place.
 - c) Protected from moisture, weather, contaminants during and after the installation process.

4.3 Indoor Air Quality Assessment: Complying with LEED Indoor Environmental Quality: Indoor Air Quality Assessment [v4] v4.1 IEQc4: After construction is completed: All interior finishes, millwork, doors, paint, carpet, acoustic tiles, and movable furnishings, FFE, (e.g., workstations, partitions)

- 1. Major VOC punch list items must be complete.
 - a) ! The below options cannot be combined!
- A. Option 1. Flush-Out Path 1: Before Occupancy
 - 1. Install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of gross floor area while maintaining an internal temperature of at least 60°F and no higher than 80°F and relative humidity no higher than 60%.
- B. [Option 1 Path 2: Path 2: During Occupancy
 - 1. If occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of gross floor area while maintaining an internal temperature of at least 60°F and no higher than 80°F and relative humidity no higher than 60%.
 - 2. Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic foot per minute (cfm) per square foot of outdoor air or the design minimum outdoor air rate determined in EQ Prerequisite Minimum Indoor Air Quality Performance, whichever is greater.
 - 3. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy.
 - 4. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outdoor air has been delivered to the space.]

OR

- C. **Option 2. Air Testing: Path 1:** After construction ends and before occupancy, under ventilation conditions typical for occupancy, conduct baseline IAQ testing in occupied spaces for the contaminants listed in:
 - 1. Path 1: Particulate matter and inorganic gases
 - 2. Test for the particulate matter (PM) and inorganic gases listed in Table 1, found in the LEED v4.1 BD+C NC rating system using an allowed test method, and demonstrate the contaminants do not exceed the concentration limits listed in table 1: Particulate Matter and Inorganic Gases

AND

- D. **Path 2: Volatile Organic Compounds** (Retail projects may conduct the testing within 14 days of occupancy.)
 - 1. Perform a screening test for Total Volatile Organic Compounds (TVOC). Use ISO 16000-6, EPA TO-17, or EPA TO-15 to collect and analyze the air sample.
 - 2. Calculate the TVOC value per EN 16516:2017, CDPH Standard Method v1.2 2017 section 3.9.4, or alternative calculation method as long as full method description is included in test report. If the TVOC levels exceed 500 µg/m³, investigate for potential issues by comparing the individual VOC levels from the GC/MS results to associated cognizant authority health based limits. Correct any identified issues and re-test if necessary.

3. Additionally, test for the individual volatile organic compounds listed in Table 2 found in the LEED v4.1 BD+C NC rating system using an allowed test method and demonstrate the contaminants do not exceed the concentration limits listed in the table.
4. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.
5. [Exemplary performance is available for projects that test for the additional target volatile organic compounds specified in CDPH Standard Method v1.2-2017, Table 4-1 and do not exceed the full CREL levels for these compounds adopted by Cal/EPA OEHHA in effect on June 2016.]
6. Indoor Air Quality Assessment Documentation Verification:
7. Option 1: Path 1 [Path 2]: Building Flush-Out Before Occupancy
8. Calculations to meet requirement: Outdoor air delivery via [both] [Permanently Installed Air Handlers] [and] [Temporary Air Handlers] [and] [Passive Ventilation Strategies] [Other] required to provide 14,000 cf outdoor air per gross square foot of interior spaces.
9. Daily log citing outdoor air temperature, humidity provided by air handling units and/or passive ventilation strategies. Path 1 [2]
10. Signed statement describing the building air flush-out procedures: (Path 1 or 2)
11. Dates flush-out occurred
12. Hours flush-out occurred
13. Total cfm outdoor air delivered per day
14. Total cumulative outdoor air delivered
15. Dates final filtration media was installed
16. Final filtration media type, manufacturer, and air handler number or location final media was installed. (Provide cut sheet)
17. Design Builder Statement that Path 1 [2] flush-out met requirements and was completed including the installation of final MERV 13 filtration media at the conclusion of Path 1 [2] procedures.
18. Product data cut-sheets for filtration media used during flush-out and prior to occupancy.

4.4 [OUTDOOR AIR QUALITY PLANNING AND MANAGEMENT

- A. Idling Limitations: Develop and implement a plan to reduce particulate matter (PM) emissions from non-road and on-road diesel and gasoline fueled vehicles, construction equipment, and temporary power generation used during construction projects.
[Refer to additional guidance and/or pursuit of LEED v4 Pilot Credit: Clean Construction: <https://www.usgbc.org/node/4810551?return=credits/new-construction/v4>]
- B. Develop a policy to limit unnecessary vehicle and equipment engine idling to no more than 5 minutes, or in compliance with applicable local, state and national laws, whichever is more stringent.
- C. Develop and include an education program, signage and operator communications.
- D. Prevention of Indoor Air Pollution: Locate equipment, vehicles, and loading/unloading staging areas away from air intakes or operable openings of adjacent buildings.]
- E. Airborne Particulate Management:: As part of Outdoor Air Quality Planning and the Project's Erosion and Sedimentation Control Plan: Minimize airborne particulate to the greatest extent possible through strategies such as:
 - a) Water and Wetting Coverage
 - b) Mulch and Vegetation
 - c) Temporary Turf and Seeding
 - d) Tillage
 - e) Board, Wind, Sedimentation Fencing
 - f) Stone, aggregate cover
 - g) References:
 - International WELL BUILDING Institute: Precondition: A04: Construction Pollution Management: Part 1: c. <https://v2.wellcertified.com/v2.1/en/air/feature/4>
 - EPA Science Inventory: Particulate Emissions From Construction Activities: Implement airborne particulate minimization strategies.

https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=111621

- The Balance Small Business: How to Control Dust at a Construction Site. <https://www.thebalancesmb.com/control-dust-at-construction-site-844446>

PART 5 - PRODUCT Identification

5.1 Additional Information to be Found in Section 01 60 00 PRODUCT REQUIREMENTS

5.2 **Defining a Product:** LEED v4 and v4.1 Material and Resources: Building Product Disclosure and Optimization (BPDO) Credits [WELL] [Other] in this category calculate achievement on the basis of number of products instead of product cost. See the below link to a graphic assisting with 'What Counts as a Product'.

<https://www.usgbc.org/sites/default/files/Does%20this%20Item%20Count%20as%20a%20Product.pdf>

- A. A “product” or a “permanently installed building product” is defined by **its function** in the project. A product includes the physical components and services needed to serve the intended function. If there are similar products within a specification, each contributes as a separate product. Examples:

- a) Products that arrive at the project site ready for installation are all separate products: Metal studs, Wallboard, Concrete masonry units (CMU)
- b) For wallboard, the gypsum, binder, and backing are all required for the product to function, so each ingredient – Does **NOT** count as a separate product.
1. Products that arrive as an ingredient or component used in a site-assembled product:
2. Concrete admixtures are considered separate products because each component (admixture, aggregate, and cement) serves a different function; each component **is therefore a separate product**.
3. Similar products from the same manufacturer with distinct formulations versus similar products from the same manufacturer with aesthetic variations or reconfigurations:
 - a) Paints of different gloss levels **are separate products** because each paint type is specified to serve a different function, such as water resistance.
 - b) Different colors of the same paint are **not** separate products because they serve the same function
 - c) Carpets of different pile heights **are separate products** because they are used for different kinds of foot traffic
 - d) The same carpet in a different color is **not** a separate product
4. Desk chairs and side chairs in the same product line **are separate products** because they serve different functions.
5. Two side chairs differing only in aesthetic aspects, such as the presence of arms, are **not** different products.

5.3 Determining Product Cost (<https://www.usgbc.org/guide/bdc>) See MR Overview.

A. **Product and materials cost:** (LEED v4.1 **Option 2:** Multi-Attribute Optimization)

1. **Includes:** All taxes and expenses to deliver the material to the project site incurred by the Design Builder.
2. **Excludes:** Costs for labor and equipment required for installation after the material is delivered to the site.

B. **Total materials cost** of a project, use either:

1. Actual materials cost or
2. Default materials cost
 - a) **Actual Materials Cost:** This is the cost of all materials being used on the project site, excluding labor but including delivery and taxes.
 - b) **Default Materials Cost:** The alternative way to determine the total materials cost is to calculate 45% of total construction costs.

- c) Default materials cost can replace the actual cost for most materials and products.
- d) If the project team is including optional products and materials, such as furniture and MEP items, add the actual value of those items to the default value for all other products and materials

C. **Location Valuation Factor**

- 1. Several credits in the Materials and Resource section include a location valuation factor (Regional Sourcing), which adds value to locally produced products and materials. The intent is to incentivize the purchase of products that support the local economy.
- 2. Products and materials that are extracted, manufactured, and purchased within 100 miles of the project are valued at 200% of their cost.
 - a) Qualifying for the location valuation factor (Regional Sourcing): meet two conditions within 100 mile radius – Direct geographical point-to-point Distance – **Not** Travel via Road, Waterway, Train Distance
 - b) All extraction
 - c) Manufacture
 - d) Purchase (including distribution): The Point of Purchase is considered the location of the purchase transaction. For online or other transactions that do not occur in person, the point of purchase is considered the location of product distribution.

D. **Salvaged and reused materials location valuation:**

- 1. Reused Materials: The source location of extraction or harvest is the location of the materials before their removal to the project site.
- 2. For material taken from another building, the source location is the building.
- 3. For items purchased from a building materials salvage store or recycling facility, the source location is the store or facility. In this case, it is not necessary to track material to the original building.

E. **Determining Material Contributions of an Assembly:** Some sustainability criteria apply to the entire product, as is the case for product certifications and programs. However, some criteria apply to only a portion of the product. The portion of the product that contributes by weight to credit requirements could be either:

- 1. Percentage of a homogeneous material
- 2. Percentage of qualifying components that are mechanically or permanently fastened together.
- 3. Homogeneous Examples: Composite flooring, ceiling tiles, and rubber wall base.
- 4. Assembly Examples (parts mechanically or permanently fastened together): Office chairs, Furniture, demountable partition walls, premade window assemblies, and doors.
- 5. **Calculate the value that contributes** toward credit compliance as the percentage, by weight, of the material or component that meets the criteria, multiplied by the total product cost.
 - a) $\text{Product value (\$)} = \text{Total product cost (\$)} \times (\%) \text{ product component by weight} \times (\%) \text{ meeting sustainable criteria}$

5.4 SUSTAINABLE DESIGN COST AND ACTION PLAN(S) SUBMITTALS

- A. Verification - Qualification Data: To be provided to Sustainability LEED Accredited Professional, Third-Party certification coordinator responsible for the completion of 'official' notification of LEED v4 - v4.1 certification through LEED Online.
- B. **Project Total Materials Cost Data:** Provide statement indicating total cost for materials used [Division 3-10, 33, 32] for Project that are applicable to LEED BD+C NC v4 – v4.1 material and resource credits MRc2, MRc3, [MRc4] [Other]
- A. Exclude costs for labor, overhead, and profit.
 - B. Exclude costs for **MEP, HVAC**, Specialty items such as elevators.
- C. **Sustainable Design Action Plan(s):** Provide preliminary action plan within [7] [14] [30] [60] <Insert number> days of date established for [commencement of the Work] [the Notice to Proceed] [the Notice of Award], indicating how the LEED v4 – v4.1 BD+C NC [WELL] requirements and criteria will be met to achieve the User Agency goal of LEED Gold®, minimum LEED Silver®.
- 1. Narrative, Option(s), Path(s), and calculations of proposed Light Pollution Reduction LEED v4 SSc6.
 - 2. Narrative, Option(s), Path(s), and calculations of proposed Outdoor Water Use Reduction to achieve the mandatory LEED v4 [v4.1] WEp1: Prerequisite: Outdoor Water Use Reduction by:
 - a) Do not install permanent landscape irrigation systems. Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period.
- OR
- 3. [Follow design and specifications 00.00.00 for the purchase and installation of irrigation systems, and plant species to reduce the project's landscape water requirement by at least **30%** from the calculated baseline for the site's peak watering month. Reductions must be achieved through plant species selection and irrigation system efficiency, as calculated by the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.]
- OR
- 4. [Follow design and specifications 00.00.00 for the purchase and installation of irrigation systems, and plant species to reduce the project's landscape water requirement by at least **50%** from the calculated baseline for the site's peak watering month. Reductions must be achieved through plant species selection and irrigation system efficiency, as calculated by the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.]
 - 5. Narrative, Option(s), Path(s), and calculations of proposed Indoor Water Use Reduction, to at a minimum, achieve the mandatory LEED v4.1 WEp2: Prerequisite: Indoor Water Use Reduction.
 - a) Purchase and install fixtures and fittings in the project building to reduce aggregate water consumption by 20% from the baseline calculations on the volume and flow rates identified in specification Section 00.00.00.
 - b) Purchase and install fixtures and fittings in the project building to reduce aggregate water consumption by 30% [35%] [40%] [45%] [50%] from the baseline calculations on the volume and flow rates identified in specification Section 00.00.00.
 - 6. Narrative, Option(s), Path(s), List of Products, of proposed Indoor Water Use Reduction to achieve LEED v4.1 WEc2: Indoor Water Use Reduction.
 - 7. List of proposed products with Building Product Disclosure and Optimization (BPDO) LEED v4.1 MRc2: Environmental Product Declarations.
 - 8. List of proposed products complying with requirements for BPDO multi-attribute optimization. LEED v4.1 MRc2
 - 9. List of proposed products complying with requirements for BPDO Sourcing of Raw Materials. LEED v4.1 MRc3
 - 10. List of proposed products complying with requirements for BPDO Material Ingredients. LEED v4.1 MRc4

11. [List of proposed products complying with requirements for LEED v4.1 [v4] Low-Emitting Materials IEQc2
 12. Waste management plan complying with Section 017419 "Construction Waste Management and Disposal."
 13. Construction Indoor Air Quality Management Plan (IAQMP) requirements for LEED v4.1 [v4] IEQc3
 14. Indoor Air Quality Assessment plan requirements complying with LEED v4.1 [v4] IEQc4
- D. **Sustainable Design Progress Report:** Provide a progress report every [30] and/or [60] days applicable to the phase of construction AND
1. Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.


PART 6 - QUALITY ASSURANCE

- A. Design Builders' LEED [Sustainability] Accredited Professional: The Design Builder is required to employ an experienced LEED Accredited Professional or Green Associate in good standing to manage and oversee the LEED third-party certification process for the construction phases.
1. The Design Builders' LEED [Sustainability] Accredited Professional shall ensure all associated prerequisite and credit deliverables [and LEED Online tasks] are completed, no later than 30 days after LEED v4.1 [v4] IEQc4 Air Quality Assessment has been performed.
 2. Provide verification documentation that the LEED [Sustainability] Accredited Professional is experienced with providing properly prepared certification verification documentation and familiar with the LEED Online process. The LEED [Sustainability] Accredited Professional shall have experience with, at a minimum, 2 [3] completed projects performing such tasks and duties specific to successfully achieving LEED v4 – v4.1 [v2009] BD+C NC construction prerequisite and credit requirements.
 3. The Design Builders' LEED [Sustainability] Accredited Professional shall maintain ongoing coordination with the project's principal LEED Accredited Professional responsible for overall LEED. The Design Builders' LEED Accredited Professional shall maintain coordination with the project's principle Accredited Professional as applicable is they are not one-in-the-same to ensure successful LEED v4 – v4.1 certification.

LEED v4 -v4.1 Domiciliary Scorecard/Checklist

LEED		LEED® BD+C NC v4 - v4.1 Scorecard - Checklist (New Construction) November 6, 2019		ILLINOIS DEPARTMENT OF VETERANS' AFFAIRS STATE OF ILLINOIS CAPITAL DEVELOPMENT BOARD Quincy, Illinois Veterans' Home: New Domiciliary 1707 N. 12th Street, Quincy, IL 62301	
60	21	29	Score Tally	Possible Points: 110	
Y	Z	N	Certified: 40 to 49, Silver: 50 to 59 Gold: 60 to 79 Platinum: 80 to 110 Points		
1	0	0	Integrative Process IP		
1		d	IPc1 Integrative Process		1
3	3	10	Location and Transportation LT		
			LTc1 LEED for Neighborhood Development Location		46
1		d	LTc2 Sensitive Land Protection		1
	2	d	LTc3 High Priority Site (High Priority Site and Equitable Development)		1-2
1	1	3	LTc4 Surrounding Density and Diverse Uses		1-5
	5	d	LTc5 Access to Quality Transit		1-5
	1	d	LTc6 Bicycle Facilities		1
	1	d	LTc7 Reduced Parking Footprint		1
1		d	LTc8 Green Vehicles (Electric Vehicles)		1
6	4	0	Sustainable Sites SS		
		d	SSp1 Construction Activity Pollution Prevention		Required
1		d	SSc1 Site Assessment		1
	2	d	SSc2 Site Development (Protect or Restore Habitat) RP		1-2
1		d	SSc3 Open Space		1
1	2	d	SSc4 Rainwater Management RP		1-3
2		d	SSc5 Heat Island Reduction		1-2
1		d	SSc6 Light Pollution Reduction		1
6	1	4	Water Efficiency		
		d	WEp1 Outdoor Water Use Reduction		Required
		d	WEp2 Indoor Water Use Reduction		Required
		d	WEp3 Building-Level Water Metering		Required
2		d	WEc1 Outdoor Water Use Reduction		1-2
3	1	2	WEc2 Indoor Water Use Reduction		1-6
	2	d	WEc3 Cooling Tower Water Use (Cooling Tower and Process Water U)		1-2
1		d	WEc4 Water Metering		1
20	7	6	Energy and Atmosphere		
		c	EAp1 Fundamental Commissioning and Verification		Required
		d	EAp2 Minimum Energy Performance		Required
		d	EAp3 Building-Level Energy Metering		Required
		d	EAp4 Fundamental Refrigerant Management		Required
5	1	c	EAc1 Enhanced Commissioning		2-6
12	3	3	EAc2 Optimize Energy Performance 12 pts = 30% reduction		1-18
1		d	EAc3 Advanced Energy Metering RP		1
	2	d	EAc4 Demand Response (Grid Harmonization)		1-2
2	2	1	EAc5 Renewable Energy Production (Renewable Energy)		1-5
	1	d	EAc6 Enhanced Refrigerant Management		1
		c	EAc7 Green Power and Carbon Offsets (v4.1/Removed)		1-2
5	2	6	Materials and Resources MR		
		d	MRp1 Storage and Collection of Recyclables		Required
		d	MRp2 Construction and Demolition Waste Management Planning		Required
	1	d	MRc1 Building Life-Cycle Impact Reduction RP		2-5
1	1	c	MRc2 BPDO - Environmental Product Declarations		1-2
1	1	c	MRc3 BPDO - Sourcing of Raw Materials		1-2
1	1	c	MRc4 BPDO - Material Ingredients		1-2
2		c	MRc5 Construction and Demolition Waste Management		1-2
11	3	2	Indoor Environmental Quality IEQ		
		d	IEQp1 Minimum Indoor Air Quality Performance		Required
		d	IEQp2 Environmental Tobacco Smoke Control		Required
2		d	IEQc1 Enhanced Indoor Air Quality Strategies RP		1-2
1	1	1	IEQc2 Low-Emitting Materials		1-3
1		c	IEQc3 Construction Indoor Air Quality Management Plan		1
2		c	IEQc4 Indoor Air Quality Assessment		1-2
1		d	IEQc5 Thermal Comfort		1
2		d	IEQc6 Interior Lighting		1-2
1	2	d	IEQc7 Daylight		1-3
1		d	IEQc8 Quality Views		1
		d	IEQc9 Acoustic Performance		1
6	0	0	Innovation		
1		d	INc1 Innovation: Green Building Education		1
1		d	INc2 Innovation: EBOM Starter		1
1		d	INc3 Innovation: Reduced Mercury		1
1		d	INc4 Innovation: Post-Occupancy Survey		1
1		d	INc5 Pilot Credit		1
1		c	INc6 LEED Accredited Professional		1
2	1	1	Regional Priority Zip Code 62301		
1		d	RPc1 Enhanced Indoor Air Quality: Threshold 2pts		1
	1	d	RPc2 Rainwater Management: Threshold 3 pts		1
		d	RPc3 High Priority Site: Threshold 2 pts		1
		d	RPc4 Building Life-Cycle Impact Reduction: Threshold 3 pts		1
		d	RPc5 Protect or Restore Habitat: Threshold 2 pts		1
1		d	RPc6 Advanced Energy Metering: Threshold: 1pt.		1
60	21	29	Score Tally	Possible Points: 1	
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points Platinum: 80 to 110					
✓ = NO CHANGE between v4 and v4.1					
d = Design Submittal c = Construction Submittal e = Exemplary Point Available RP = Regional Incentive Point Awarded in Addition to Identified Credit and Point Threshold Achievement					
BPDO = Building Product Disclosure and Optimization					

LEED v4 -v4.1 Infirmary Scorecard/Checklist

 LEED® BD+C NC v4 - v4.1 Scorecard - Checklist (New Construction) November 6, 2019				ILLINOIS DEPARTMENT OF VETERANS' AFFAIRS STATE OF ILLINOIS CAPITAL DEVELOPMENT BOARD Quincy, Illinois Veterans' Home: New Nursing Home 1707 N. 12th Street, Quincy, IL 62301			
58	19	33	Score Tally	Possible Points: 110			
Certified: 40 to 49, Silver: 50 to 59, Gold: 60 to 79, Platinum: 80 to 110 Points							
1	0	0	Integrative Process IP				
1			IPc1 Integrative Process			1	
3	3	10	Location and Transportation LT				
1			LTc2 Sensitive Land Protection			1	
			LTc3 High Priority Site (High Priority Site and Equitable Development)			1-2	
1	1	3	LTc4 Surrounding Density and Diverse Uses			1-5	
			LTc5 Access to Quality Transit			1-5	
1			LTc6 Bicycle Facilities			1	
1			LTc7 Reduced Parking Footprint			1	
1			LTc8 Green Vehicles (Electric Vehicles)			1	
6	4	0	Sustainable Sites SS				
			SSp1 Construction Activity Pollution Prevention			Required	
1			SSc1 Site Assessment			1	
	2		SSc2 Site Development (Protect or Restore Habitat) RP			1-2	
1			SSc3 Open Space			1	
1	2		SSc4 Rainwater Management RP			1-3	
2			SSc5 Heat Island Reduction			1-2	
1			SSc6 Light Pollution Reduction ✓			1	
6	1	4	Water Efficiency				
			WEp1 Outdoor Water Use Reduction ✓			Required	
			WEp2 Indoor Water Use Reduction			Required	
			WEp3 Building-Level Water Metering ✓			Required	
2			WEc1 Outdoor Water Use Reduction ✓			1-2	
3	1	2	WEc2 Indoor Water Use Reduction ✓			1-6	
			WEc3 Cooling Tower Water Use (Cooling Tower and Process Water Use)			1-2	
1			WEc4 Water Metering ✓			1	
20	7	6	Energy and Atmosphere				
			EAp1 Fundamental Commissioning and Verification			Required	
			EAp2 Minimum Energy Performance			Required	
			EAp3 Building-Level Energy Metering ✓			Required	
			EAp4 Fundamental Refrigerant Management			Required	
5	1		EAc1 Enhanced Commissioning			2-6	
12	3	3	EAc2 Optimize Energy Performance 12 pts = 30% reduction			1-18	
1			EAc3 Advanced Energy Metering ✓ RP			1	
			ERc4 Demand Response (Grid Harmonization)			1-2	
2	2	1	EAc5 Renewable Energy Production (Renewable Energy)			1-5	
1			EAc6 Enhanced Refrigerant Management ✓			1	
			EAc7 Green Power and Carbon Offsets (v4.1 Removed)			1-2	
5	2	6	Materials and Resources MR				
			MRp1 Storage and Collection of Recyclables			Required	
			MRp2 Construction and Demolition Waste Management Planning			Required	
	1	4	MRc1 Building Life-Cycle Impact Reduction RP			2-5	
1	1		MRc2 BPDO - Environmental Product Declarations			1-2	
1			MRc3 BPDO - Sourcing of Raw Materials			1-2	
1			MRc4 BPDO - Material Ingredients			1-2	
2			MRc5 Construction and Demolition Waste Management			1-2	
9	1	6	Indoor Environmental Quality IEQ				
			IEQp1 Minimum Indoor Air Quality Performance			Required	
			IEQp2 Environmental Tobacco Smoke Control			Required	
2			IEQc1 Enhanced Indoor Air Quality Strategies RP			1-2	
1	1	1	IEQc2 Low-Emitting Materials ✓			1-3	
1			IEQc3 Construction Indoor Air Quality Management Plan			1	
2			IEQc4 Indoor Air Quality Assessment			1-2	
1			IEQc5 Thermal Comfort			1	
2			IEQc6 Interior Lighting ✓			1-2	
			IEQc7 Daylight ✓			1-3	
			IEQc8 Quality Views ✓			1	
			IEQc9 Acoustic Performance			1	
6	0	0	Innovation				
1			INc1 Innovation: Green Building Education			1	
1			INc2 Innovation: EBCOM Starter -			1	
1			INc3 Innovation: Reduced Mercury			1	
1			INc4 Innovation: Post-Occupancy Survey			1	
1			INc5 Pilot Credit:			1	
1			INc6 LEED Accredited Professional			1	
2	1	1	Regional Priority Zip Code 62301				
1			RPc1 Enhanced Indoor Air Quality: Threshold 2pts			1	
	1		RPc2 Rainwater Management: Threshold 3 pts			1	
			RPc3 High Priority Site: Threshold 2 pts			1	
			RPc4 Building Life-Cycle Impact Reduction: Threshold 3 pts			1	
			RPc5 Protect or Restore Habitat: Threshold 2 pts			1	
1			RPc6 Advanced Energy Metering: Threshold: 1pt			1	
58	19	33	Score Tally	Possible Points: 110			
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110 points							
✓ = NO CHANGE between v4 and v4.1 = Design Submittal, c = Construction Submittal, = Exemplary Point Available, RP = Regional Incentive Point Awarded in Addition to Identified Credit and Point Threshold Achievement BPDO = Building Product Disclosure and Optimization							



LEED® BD+C NC v4 - v4.1 Scorecard - Checklist
(New Construction)

November 6, 2019

58	19	33	Score Tally	Possible Points:	110
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Y ? N Certified: 40 to 49, Silver: 50 to 59 **Gold: 60 to 79** Platinum: 80 to 110 Points

1	0	0	Integrative Process IP	
1			IPc1 Integrative Process	1

3	3	10	Location and Transportation LT	
			LTc1 LEED for Neighborhood Development Location	±6
1			LTc2 Sensitive Land Protection	1
	2		LTc3 High Priority Site (High Priority Site and Equitable Development) RP	1-2
1	1	3	LTc4 Surrounding Density and Diverse Uses	1-5
	5		LTc5 Access to Quality Transit ☼	1-5
			LTc6 Bicycle Facilities	1
1			LTc7 Reduced Parking Footprint ☼	1
1			LTc8 Green Vehicles (Electric Vehicles) ☼	1

6	4	0	Sustainable Sites SS	
			SSp1 Construction Activity Pollution Prevention	Required
1			SSc1 Site Assessment	1
	2		SSc2 Site Development (Protect or Restore Habitat) RP	1-2
1			SSc3 Open Space	1
1	2		SSc4 Rainwater Management RP	1-3
2			SSc5 Heat Island Reduction	1-2
1			SSc6 Light Pollution Reduction ✓	1

6	1	4	Water Efficiency	
			WEp1 Outdoor Water Use Reduction ✓	Required
			WEp2 Indoor Water Use Reduction	Required
			WEp3 Building-Level Water Metering ✓	Required
2			WEC1 Outdoor Water Use Reduction ✓	1-2
3	1	2	WEC2 Indoor Water Use Reduction ✓	1-6
	2		WEC3 Cooling Tower Water Use (Cooling Tower and Process Water Use)	1-2
1			WEC4 Water Metering ✓	1

20	7	6	Energy and Atmosphere	
			EAp1 Fundamental Commissioning and Verification	Required
			EAp2 Minimum Energy Performance	Required
			EAp3 Building-Level Energy Metering ✓	Required
			EAp4 Fundamental Refrigerant Management	Required
5	1		EAc1 Enhanced Commissioning	2-6
12	3	3	EAc2 Optimize Energy Performance ☼ 12 pts = 30% reduction	1-18
1			EAc3 Advanced Energy Metering ✓ RP	1
	2		EAc4 Demand Response (Grid Harmonization)	1-2
2	2	1	EAc5 Renewable Energy Production (Renewable Energy)	1-5
	1		EAc6 Enhanced Refrigerant Management ✓	1
			EAc7 Green Power and Carbon Offsets (v4.1 Removed)	1-2

ILLINOIS DEPARTMENT OF VETERANS' AFFAIRS
STATE OF ILLINOIS CAPITAL DEVELOPMENT BOARD
Quincy, Illinois Veterans' Home: **New Nursing Home**

1707 N. 12th Street, Quincy, IL 62301



Y ? N

5	2	6	Materials and Resources MR	
			MRp1 Storage and Collection of Recyclables	Required
			MRp2 Construction and Demolition Waste Management Planning	Required
	1	4	MRc1 Building Life-Cycle Impact Reduction ☼ RP	2-5
1	1		MRc2 BPDO - Environmental Product Declarations	1-2
1		1	MRc3 BPDO - Sourcing of Raw Materials	1-2
1		1	MRc4 BPDO - Material Ingredients	1-2
2			MRc5 Construction and Demolition Waste Management	1-2

9	1	6	Indoor Environmental Quality IEQ	
			IEQp1 Minimum Indoor Air Quality Performance	Required
			IEQp2 Environmental Tobacco Smoke Control	Required
2			IEQc1 Enhanced Indoor Air Quality Strategies RP	1-2
1	1	1	IEQc2 Low-Emitting Materials ✓	1-3
1			IEQc3 Construction Indoor Air Quality Management Plan	1
2			IEQc4 Indoor Air Quality Assessment	1-2
1			IEQc5 Thermal Comfort	1
2			IEQc6 Interior Lighting ✓	1-2
	3		IEQc7 Daylight *	1-3
	1		IEQc8 Quality Views ✓	1
	1		IEQc9 Acoustic Performance	1

6	0	0	Innovation	
1			INc1 Innovation: Green Building Education	1
1			INc2 Innovation: EBOM Starter -	1
1			INc3 Innovation: Reduced Mercury	1
1			INc4 Innovation: Post-Occupancy Survey	1
1			INc5 Pilot Credit:	1
1			INc6 LEED Accredited Professional	1

2	1	1	Regional Priority	Zip Code 62301
1			RPc1 Enhanced Indoor Air Quality: Threshold 2pts	1
	1		RPc2 Rainwater Management: Threshold 3 pts	1
			RPc3 High Priority Site: Threshold 2 pts	1
	1		RPc4 Building Life-Cycle Impact Reduction: Threshold 3 pts	1
			RPc5 Protect or Restore Habitat: Threshold 2 pts	1
1			RPc6 Advanced Energy Metering: Threshold: 1 pt.	1

58	19	33	Score Tally	Possible Points:	1
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Certified: 40 to 49 points, Silver: 50 to 59 points, **Gold: 60 to 79 points**, Platinum: 80 to 110

✓ = NO CHANGE between v4 and v4.1

d = Design Submittal c = Construction Submittal ☼ = Exemplary Point Available **RP** = Regional Incentive Point Awarded in Addition to Identified Credit and Point Threshold Achievement

BPDO = Building Product Disclosure and Optimization



LEED® BD+C NC v4 - v4.1 Scorecard - Checklist
(New Construction)

November 6, 2019

ILLINOIS DEPARTMENT OF VETERANS' AFFAIRS
STATE OF ILLINOIS CAPITAL DEVELOPMENT BOARD

Quincy, Illinois Veterans' Home: **New Domiciliary**

1707 N. 12th Street, Quincy, IL 62301



60	21	29	Score Tally	Possible Points:	110
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Y ? N Certified: 40 to 49, Silver: 50 to 59 **Gold: 60 to 79** Platinum: 80 to 110 Points

1	0	0	Integrative Process IP	
1		d	IPc1 Integrative Process	1

3	3	10	Location and Transportation LT	
			LTc1 LEED for Neighborhood Development Location	16
1		d	LTc2 Sensitive Land Protection	1
	2	d	LTc3 High Priority Site (High Priority Site and Equitable Development) RP	1-2
1	1	3	LTc4 Surrounding Density and Diverse Uses	1-5
	5	d	LTc5 Access to Quality Transit	1-5
1		d	LTc6 Bicycle Facilities	1
1		d	LTc7 Reduced Parking Footprint	1
1		d	LTc8 Green Vehicles (Electric Vehicles)	1

6	4	0	Sustainable Sites SS	
		c	SSp1 Construction Activity Pollution Prevention	Required
1		d	SSc1 Site Assessment	1
	2	d	SSc2 Site Development (Protect or Restore Habitat) RP	1-2
1		d	SSc3 Open Space	1
1	2	d	SSc4 Rainwater Management RP	1-3
2		d	SSc5 Heat Island Reduction	1-2
1		d	SSc6 Light Pollution Reduction	1

6	1	4	Water Efficiency	
		d	WEp1 Outdoor Water Use Reduction	Required
		d	WEp2 Indoor Water Use Reduction	Required
		d	WEp3 Building-Level Water Metering	Required
2		d	WEC1 Outdoor Water Use Reduction	1-2
3	1	2	WEC2 Indoor Water Use Reduction	1-6
	2	d	WEC3 Cooling Tower Water Use (Cooling Tower and Process Water Use)	1-2
1		d	WEC4 Water Metering	1

20	7	6	Energy and Atmosphere	
		c	EAp1 Fundamental Commissioning and Verification	Required
		d	EAp2 Minimum Energy Performance	Required
		d	EAp3 Building-Level Energy Metering	Required
		d	EAp4 Fundamental Refrigerant Management	Required
5	1	c	EAc1 Enhanced Commissioning	2-6
12	3	3	EAc2 Optimize Energy Performance 12 pts = 30% reduction	1-18
1		d	EAc3 Advanced Energy Metering RP	1
	2	d	EAc4 Demand Response (Grid Harmonization)	1-2
2	2	1	EAc5 Renewable Energy Production (Renewable Energy)	1-5
1		d	EAc6 Enhanced Refrigerant Management	1
		c	EAc7 Green Power and Carbon Offsets (v4.1 Removed)	1-2

5	2	6	Materials and Resources MR	
		d	MRp1 Storage and Collection of Recyclables	Required
		d	MRp2 Construction and Demolition Waste Management Planning	Required
1	4	d	MRc1 Building Life-Cycle Impact Reduction RP	2-5
1	1	c	MRc2 BPDO - Environmental Product Declarations	1-2
1		1	MRc3 BPDO - Sourcing of Raw Materials	1-2
1		1	MRc4 BPDO - Material Ingredients	1-2
2		c	MRc5 Construction and Demolition Waste Management	1-2

11	3	2	Indoor Environmental Quality IEQ	
		d	IEQp1 Minimum Indoor Air Quality Performance	Required
		d	IEQp2 Environmental Tobacco Smoke Control	Required
2		d	IEQc1 Enhanced Indoor Air Quality Strategies RP	1-2
1	1	1	IEQc2 Low-Emitting Materials	1-3
1		c	IEQc3 Construction Indoor Air Quality Management Plan	1
2		c	IEQc4 Indoor Air Quality Assessment	1-2
1		d	IEQc5 Thermal Comfort	1
2		d	IEQc6 Interior Lighting	1-2
1	2	d	IEQc7 Daylight	1-3
1		d	IEQc8 Quality Views	1
	1	d	IEQc9 Acoustic Performance	1

6	0	0	Innovation	
1		d	INC1 Innovation: Green Building Education	1
1		d	INC2 Innovation: EBOM Starter	1
1		d	INC3 Innovation: Reduced Mercury	1
1		d	INC4 Innovation: Post-Occupancy Survey	1
1		d	INC5 Pilot Credit:	1
1		c	INC6 LEED Accredited Professional	1

2	1	1	d	Regional Priority Zip Code 62301	
1		d	RPc1 Enhanced Indoor Air Quality: Threshold 2pts	1	
	1	d	RPc2 Rainwater Management: Threshold 3 pts	1	
		d	RPc3 High Priority Site: Threshold 2 pts	1	
		1	RPc4 Building Life-Cycle Impact Reduction: Threshold 3 pts	1	
		d	RPc5 Protect or Restore Habitat: Threshold 2 pts	1	
1		d	RPc6 Advanced Energy Metering: Threshold: 1 pt.	1	

60	21	29	Score Tally	Possible Points:	1
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Certified: 40 to 49 points, Silver: 50 to 59 points, **Gold: 60 to 79 points** Platinum: 80 to 110

✓ = NO CHANGE between v4 and v4.1

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BPDO = Building Product Disclosure and Optimization

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS shall form the basis of the construction phase commissioning process and procedures. The Commissioning Agent shall add, modify, and refine the commissioning procedures, as approved by the User Agency, to suit field conditions and actual manufacturer's equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks. Additions or modifications in refining the commissioning procedures are not a basis for a change order.
- B. Various sections of the project specifications require equipment start-up, testing, and adjusting services. Requirements for start-up, testing, and adjusting services specified in the Division 07, Division 08, Division 20, Division 21, Division 22, Division 23, Division 25, Division 26, Division 27, and Division 28 series sections of these specifications are intended to be provided in coordination with the commissioning services and are not intended to duplicate services. The Design Builder shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.
- C. Where individual testing, adjusting, or related services are required in the project specifications and not specifically required by this commissioning requirements specification, the specified services shall be provided and copies of documentation, as required by those specifications, shall be submitted to the USER AGENCY and the Commissioning Agent to be indexed for future reference.
- D. Where training or educational services for USER AGENCY are required and specified in the Division 7, Division 08 Division 20, Division 21, Division 22, Division 23, Division 25, Division 26, Division 27, and Division 28, series sections of the specification, these services are intended to be provided in addition to the training and educational services specified herein.
- E. Commissioning is a systematic process of verifying that the building systems perform interactively according to the construction documents and the USER AGENCY's operational needs. The commissioning process shall encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction, acceptance, and warranty phases is intended to achieve the following specific objectives according to the contract documents:
 - 1. Verify that the applicable equipment and systems are installed in accordance with the contract documents and according to the manufacturer's recommendations.
 - 2. Verify and document proper integrated performance of equipment and systems.
 - 3. Verify that O&M documentation is complete.
 - 4. Verify that all components requiring servicing can be accessed, serviced and removed without disturbing nearby components including ducts, piping, cabling or wiring.
 - 5. Verify that the USER AGENCY's operating personnel are adequately trained.
 - 6. Document the successful achievement of the commissioning objectives listed above.
- F. The commissioning process does not take away from or reduce the responsibility of the Design Builder to provide a finished and fully functioning product.

1.2 RELATED WORK

- A. Division 01 – GENERAL REQUIREMENTS
- B. Division 07 – THERMAL AND MOISTURE PROTECTION
- C. Division 08 – OPENINGS
- D. Division 20 – NOT USED
- E. Division 21 – FIRE SUPPRESSION
- F. Division 22 – PLUMBING
- G. Division 23 – HEATING, VENTILATING, AND AIR CONDITIONING

- H. Division 25 – NOT USED
- I. Division 26 – ELECTRICAL
- J. Division 27 – COMMUNICATIONS
- K. Division 28 – ELECTRONIC SAFETY AND SECURITY

1.3 CONTRACTUAL RELATIONSHIP

- A. For this construction project, the User Agency contracts with a Design Builder to provide construction services. The contracts are administered by the User Agency's Project Manager. On this project, the authority to modify the contract in any way is strictly limited to the authority of the User Agency's Project Manager.
- B. Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. By its nature, a high level of communication and cooperation between the Commissioning Agent and all other parties (Bridging Architects, Engineers, Sub Design Builders, Vendors, third party testing agencies, etc.) is essential to the success of the Commissioning effort.
- C. With these fundamental practices in mind, the commissioning process described herein has been developed to recognize that, in the execution of the Commissioning Process, the Commissioning Agent must develop effective methods to communicate with every member of the construction team involved in delivering commissioned systems while simultaneously respecting the exclusive contract authority of the Contracting Officer and Resident Engineer. Thus, the procedures outlined in this specification must be executed within the following limitations:
 - 1. No communications (verbal or written) from the Commissioning Agent shall be deemed to constitute direction that modifies the terms of any contract.
 - 2. Commissioning Issues identified by the Commissioning Agent will be delivered to the User Agency and copied to the designated Commissioning Representatives for the Design Builder and sub Design Builders on the Commissioning Team for information only in order to expedite the communication process. These issues must be understood as the professional opinion of the Commissioning Agent and as suggestions for resolution.
 - 3. In the event that any Commissioning Issues and suggested resolutions are deemed by the User Agency to require either an official interpretation of the construction documents or require a modification of the contract documents, the User Agency Project Manager will issue an official directive to this effect.
 - 4. All parties to the Commissioning Process shall be individually responsible for alerting the User agency Project Manager of any issues that they deem to constitute a potential contract change prior to acting on these issues.
 - 5. Authority for resolution or modification of design and construction issues rests solely with the User agency Project Manager, with appropriate technical guidance from the Bridging Architect/Engineer and/or Commissioning Agent.

1.4 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. User Agency's Project Requirements (OPR) and Basis of Design (BOD) documentation prepared by User Agency and Bridging Architect contains requirements that apply to this Section.

1.5 SUMMARY

- A. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

1.6 ACRONYMS

List of Acronyms	
Acronym	Meaning
A/E	Bridging Architect / Engineer Design Team
AHJ	Authority Having Jurisdiction
ASHRAE	Association Society for Heating Air Condition and Refrigeration Engineers
BAS	Building Automation System
BOD	Basis of Design
BSC	Building Systems Commissioning

List of Acronyms	
Acronym	Meaning
CCTV	Closed Circuit Television
CD	Construction Documents
CMMS	Computerized Maintenance Management System
COBie	Construction Operations Building Information Exchange
CPC	Construction Phase Commissioning
Cx	Commissioning
CxA	Commissioning Agent
CxM	Commissioning Manager
CxR	Commissioning Representative
DPC	Design Phase Commissioning
FPT	Functional Performance Test
GBI-GG	Green Building Initiative - Green Globes
HVAC	Heating, Ventilation, and Air Conditioning
LEED	Leadership in Energy and Environmental Design
NEBB	National Environmental Balancing Bureau
O&M	Operations & Maintenance
OPR	User Agency's Project Requirements
PFC	Pre-Functional Checklist
SD	Schematic Design
SO	Site Observation
TAB	Test Adjust and Balance
USGBC	United States Green Building Council

1.7 DEFINITIONS

Bridging Architect: Includes Bridging Architect identified in the Contract for Construction between the USER AGENCY and Design Builder, plus consultant/design professionals responsible for design of fire suppression, plumbing, HVAC, controls for HVAC systems, electrical, communications, electronic safety and security, as well as other related systems.

Acceptance Phase Commissioning: Commissioning tasks executed after most construction has been completed, most Site Observations and Static Tests have been completed and Pre-Functional Testing has been completed and accepted. The main commissioning activities performed during this phase are verification that the installed systems are functional by conducting Systems Functional Performance tests and User Agency Training.

Accuracy: The capability of an instrument to indicate the true value of a measured quantity.

Back Check: A back check is a verification that an agreed upon solution to a design comment has been adequately addressed in a subsequent design review

Basis of Design (BOD): The Engineer's Basis of Design is comprised of two components: the Design Criteria and the Design Narrative, these documents record the concepts, calculations, decisions, and product selections used to meet the User Agency's Project Requirements (OPR) and to satisfy applicable regulatory requirements, standards, and guidelines.

Benchmarks: Benchmarks are the comparison of a building's energy usage to other similar buildings and to the building itself. For example, ENERGY STAR Portfolio Manager is a frequently used and nationally recognized building energy benchmarking tool.

Building Information Modeling (BIM): Building Information Modeling is a parametric database which allows a building to be designed and constructed virtually in 3D, and provides reports both in 2D views and as schedules. This electronic information can be extracted and reused for pre-populating facility management CMMS systems. Building Systems Commissioning (BSC): NEBB acronym used to designate its commissioning program.

Calibrate: The act of comparing an instrument of unknown accuracy with a standard of known accuracy to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the tested instrument.

CCTV: Closed circuit Television. Normally used for security surveillance and alarm detections as part of a special electrical security system.

COBie: Construction Operations Building Information Exchange (COBie) is an electronic industry data format used to transfer information developed during design, construction, and commissioning into the Computer Maintenance Management Systems (CMMS) used to operate facilities. See the Whole Building Design Guide website for further information (<http://www.wbdg.org/resources/cobie.php>)

Commissionability: Defines a design component or construction process that has the necessary elements that will allow a system or component to be effectively measured, tested, operated and commissioned

Commissioning Agent (CxA): The qualified Commissioning Professional who administers the Cx process by managing the Cx team and overseeing the Commissioning Process. Where CxA is used in this specification it means the Commissioning Agent, members of his staff or appointed members of the commissioning team. Note that LEED uses the term Commissioning Authority in lieu of Commissioning Agent.

Commissioning Plan: A document that outlines the commissioning process, commissioning scope and defines responsibilities, processes, schedules, and the documentation requirements of the Commissioning Process.

Commissioning Process: A quality focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that the facility and all of its systems, components, and assemblies are planned, designed, installed, tested, can be operated, and maintained to meet the User Agency's Project Requirements.

Commissioning Report: The final commissioning document which presents the commissioning process results for the project. Cx reports include an executive summary, the commissioning plan, issue log, correspondence, and all appropriate check sheets and test forms.

Commissioning Representative (CxR): An individual appointed by a sub-Design Builder to manage the commissioning process on behalf of the sub-Design Builder.

Commissioning Specifications: The contract documents that detail the objective, scope and implementation of the commissioning process as developed in the Commissioning Plan.

Commissioning Team: Individual team members whose coordinated actions are responsible for implementing the Commissioning Process.

Construction Phase Commissioning: All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.

Contract Documents (CD): Contract documents include design and construction contracts, price agreements and procedure agreements. Contract Documents also include all final and complete drawings, specifications and all applicable contract modifications or supplements.

Construction Phase Commissioning (CPC): All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.

Coordination Drawings: Drawings showing the work of all trades that are used to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances. On mechanical projects, coordination drawings include structural steel, ductwork, major piping and electrical conduit and show the elevations and locations of the above components.

Data Logging: The monitoring and recording of temperature, flow, current, status, pressure, etc. of equipment using stand-alone data recorders.

Deferred System Test: Tests that cannot be completed at the end of the acceptance phase due to ambient conditions, schedule issues or other conditions preventing testing during the normal acceptance testing period.

Deficiency: See "Commissioning Issue".

Design Criteria: A listing of the Design Criteria outlining the project design requirements, including its source. These are used during the design process to show the design elements meet the OPR.

Design Intent: The overall term that includes the OPR and the BOD. It is a detailed explanation of the ideas, concepts, and criteria that are defined by the User Agency to be important. The design intent documents are utilized to provide a written record of these ideas, concepts and criteria.

Design Narrative: A written description of the proposed design solutions that satisfy the requirements of the OPR.

Design Phase Commissioning (DPC): All commissioning tasks executed during the design phase of the project.

Environmental Systems: Systems that use a combination of mechanical equipment, airflow, water flow and electrical energy to provide heating, ventilating, air conditioning, humidification, and dehumidification for the purpose of human comfort or process control of temperature and humidity.

Executive Summary: A section of the Commissioning report that reviews the general outcome of the project. It also includes any unresolved issues, recommendations for the resolution of unresolved issues and all deferred testing requirements.

Functionality: This defines a design component or construction process which will allow a system or component to operate or be constructed in a manner that will produce the required outcome of the OPR.

Functional Test Procedure (FTP): A written protocol that defines methods, steps, personnel, and acceptance criteria for tests conducted on components, equipment, assemblies, systems, and interfaces among systems.

Industry Accepted Best Practice: A design component or construction process that has achieved industry consensus for quality performance and functionality. Refer to the current edition of the NEBB Design Phase Commissioning Handbook for examples.

Installation Verification: Observations or inspections that confirm the system or component has been installed in accordance with the contract documents and to industry accepted best practices.

Integrated System Testing: Integrated Systems Testing procedures entail testing of multiple integrated systems performance to verify proper functional interface between systems. Typical Integrated Systems Testing includes verifying that building systems respond properly to loss of utility, transfer to emergency power sources, re-transfer from emergency power source to normal utility source; interface between HVAC controls and Fire Alarm systems for equipment shutdown, interface between Fire Alarm system and elevator control systems for elevator recall and shutdown; interface between Fire Alarm System and Security Access Control Systems to control access to spaces during fire alarm conditions; and other similar tests as determined for each specific project. **Issues Log:** A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the Commissioning Team during the course of the Commissioning Process.

Lessons Learned Workshop: A workshop conducted to discuss and document project successes and identify opportunities for improvements for future projects.

Maintainability: A design component or construction process that will allow a system or component to be effectively maintained. This includes adequate room for access to adjust and repair the equipment. Maintainability also includes components that have readily obtainable repair parts or service.

Manual Test: Testing using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the 'observation').

USER AGENCY: Includes the USER AGENCY, or other authorized representative of the User Agency.

User Agency's Project Requirements (OPR): A written document that details the project requirements and the expectations of how the building and its systems will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

Precision: The ability of an instrument to produce repeatable readings of the same quantity under the same conditions. The precision of an instrument refers to its ability to produce a tightly grouped set of values around the mean value of the measured quantity.

Pre-Design Phase Commissioning: Commissioning tasks performed prior to the commencement of design activities that includes project programming and the development of the commissioning process for the project

Pre-Functional Checklist (PFC): Pre-functional Checklist: a list of items provided by the Commissioning Agent to the Design Builder that require inspection and elementary component tests conducted to verify proper installation of equipment. Pre-functional Checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some Pre-functional Checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The term "System Readiness" refers to before functional testing. Pre-

functional Checklists augment and are combined with the manufacturer's start-up checklist and the Design Builder's Quality Control checklists.

Pre-Functional Test (PFT): An inspection or test that is done before functional testing. PFT's include installation verification and system and component start up tests.

Procedure or Protocol: A defined approach that outlines the execution of a sequence of work or operations. Procedures are used to produce repeatable and defined results.

Range: The upper and lower limits of an instrument's ability to measure the value of a quantity for which the instrument is calibrated.

Resolution: This word has two meanings in the Cx Process. The first refers to the smallest change in a measured variable that an instrument can detect. The second refers to the implementation of actions that correct a tested or observed deficiency.

Site Observation Visit: On-site inspections and observations made by the Commissioning Agent for the purpose of verifying component, equipment, and system installation, to observe Design Builder testing, equipment start-up procedures, or other purposes.

Site Observation Reports (SOR): Reports of site inspections and observations made by the Commissioning Agent. Observation reports are intended to provide early indication of an installation issue which will need correction or analysis.

Special System Inspections: Inspections required by a local code authority prior to occupancy and are not normally a part of the commissioning process.

Static Tests: Tests or inspections that validate a specified static condition such as pressure testing. Static tests may be specification or code initiated.

Start Up Tests: Tests that validate the component or system is ready for automatic operation in accordance with the manufactures requirements.

System: A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the complex is designed. For example, air conditioning supply air is only one component of an entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam supply, chilled water supply, refrigerant supply, hot water supply, controls and electrical service, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of the fuel supply, combustion air, controls, steam, feed water supply, condensate return and other related components.

Systems Functional Performance Test: a test, or tests, of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Systems Functional Performance Testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The Commissioning Agent develops the Systems Functional Test Procedures in a sequential written form, coordinates, directs and documents the actual testing. Systems Functional Testing is performed by the Design Builder. Systems Functional Performance Tests are performed after Pre-functional Checklists, startups, and control systems are complete and functional, and TAB functions are complete.

Systems Manual: A system-focused composite document that includes all information required for the User Agency's operators to operate the systems.

Test Procedure: A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems.

Testing: The use of specialized and calibrated instruments to measure parameters such as: temperature, pressure, vapor flow, air flow, fluid flow, rotational speed, electrical characteristics, velocity, and other data in order to determine performance, operation, or function.

Testing, Adjusting, and Balancing (TAB): A systematic process or service applied to heating, ventilating and air-conditioning (HVAC) systems and other environmental systems to achieve and document air and hydronic flow rates. The standards and procedures for providing these services are referred to as "Testing, Adjusting, and Balancing" and are described in the Procedural Standards for the Testing, Adjusting and Balancing of Environmental Systems, published by NEBB or AABC.

Thermal Scans: Thermographic pictures taken with an Infrared Thermographic Camera. Thermographic pictures show the relative temperatures of objects and surfaces and are used to identify leaks, thermal bridging, thermal intrusion, electrical overload conditions, moisture containment, and insulation failure.

Training Plan: A written document that details, in outline form the expectations of the operator training. Training agendas should include instruction on how to obtain service, operate, startup, and shutdown; and maintain all systems and components of the project.

Trending: Monitoring over a period of time with the building automation system.

Unresolved Commissioning Issue: Any Commissioning Issue that, at the time that the Final Report or the Amended Final Report is issued that has not been either resolved by the construction team or accepted by the User Agency.

Validation: See Verification

Verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the User Agency's Project Requirements.

Warranty Period: Warranty period for entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

Warranty Phase Commissioning: Commissioning efforts executed after a project has been completed and accepted by the User Agency. Warranty Phase Commissioning includes follow-up on verification of system performance, measurement and verification tasks and assistance in identifying warranty issues and enforcing warranty provisions of the construction contract.

Warranty Visit: A commissioning meeting and site review where all outstanding warranty issues and deferred testing is reviewed and discussed.

Whole Building Commissioning: Commissioning of building systems such as Building Envelope, HVAC, Electrical, Special Electrical (Fire Alarm, Security & Communications), Plumbing and Fire Protection as described in this specification.

1.8 SYSTEMS TO BE COMMISSIONED

- A. Commissioning of a system or systems specified for this project is part of the construction process. Documentation and testing of these systems, as well as training of the USER AGENCY's Operation and Maintenance personnel, is required in cooperation with the USER AGENCY and the Commissioning Agent.
- B. The systems to be enhanced commissioned as part of this LEED project include at a minimum:
 - 1. Envelope Commissioning:
 - a. Building Envelope: Air Barrier and Vapor Control
 - b. Building Envelope: Thermal Barrier
 - c. Building Envelope: Weather-Resistive Barrier
 - 2. Mechanical and Plumbing Commissioning:
 - a. HVAC&R systems
 - b. Building Automation System
 - c. Chilled Water System
 - d. Hot Water System
 - e. Air Handling Units
 - f. Specialty Exhaust Fans
 - g. General Exhaust Fans
 - h. Terminal Units
 - i. Domestic hot water system
 - j. Domestic water system
 - k. Sewage and sump pumps

3. Electrical Commissioning:
 - a. Transformers
 - b. Substation
 - c. Switchgears
 - d. Panelboards
 - e. Emergency Generator
 - f. Automatic Transfer Switches
 - g. Grounding and Bonding
 - h. Structured Cabling System
 - i. Interior Lighting Controls
 - j. Exterior Lighting Controls
 - k. Interior and Exterior Lighting Fixtures
 - l. Advanced Metering
 - m. Solar PV Array
 - n. Electric Vehicle Charging Installation
4. Fire Alarm Commissioning:
 - a. Fire Alarm Panel
 - b. FA Annunciation / Detection
 - c. FP Tamper / Flow Switches
 - d. Fire Pump / Jockey Pump
5. Security and other Commissioning:
 - a. Security - Access Controls
 - b. Security - CCTV
 - c. Nurse Call
 - d. WiFi (medical records)
 - e. Patient Bed Service (Med gas)
 - f. Elevators

1.9 COMMISSIONING TEAM

- A. The commissioning team shall consist of, but not be limited to, representatives of Design Builder, including Project Superintendent and sub Design Builders, installers, schedulers, suppliers, and specialists deemed appropriate by the User Agency and Commissioning Agent.
- B. Members Appointed by Design Builder:
 1. Design Builder: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.
 2. Design Builder' Commissioning Manager: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.
 3. Design Builder's Commissioning Representative(s): Individual(s), each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of Design Builder, including Project Superintendent and sub-Design Builders, installers, suppliers, and specialists deemed appropriate by the USER AGENCY and Commissioning Agent.
- C. Members Appointed by User Agency:
 1. Commissioning Agent: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. The USER AGENCY will engage the CxA under a separate contract.
 2. Representatives of the facility user and operation and maintenance personnel.
 3. Bridging Architect and engineering design professionals.

1.10 USER AGENCY'S RESPONSIBILITIES

- A. Develop and provide the User Agency's Project Requirements (OPR) documentation to the design team for use in developing the Basis of Design (BOD) document and the CxA for use in reviewing the design documents (basis of design document, drawings and specifications), developing the commissioning plan, Pre-functional Checklists, and functional test procedures.

- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
 - 1. Coordination meetings.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Testing meetings.
 - 4. Witness and assist in systems functional testing.
 - 5. Demonstration of operation of systems, subsystems, and equipment.
- C. Provide the design documents, prepared by Bridging Architect and approved by USER AGENCY, to the Commissioning Agent and for use in directing the commissioning process, developing the commissioning plan, systems manuals, and reviewing the operation and maintenance training plan.
- D. Provide utility services required for the commissioning process unless temporary or construction phase utilities are required to be provided by the Design Builder.

1.11 DESIGN BUILDER'S COMMISSIONING RESPONSIBILITIES

- A. The Design Builder shall assign a Commissioning Manager to manage commissioning activities of the Design Builders, subDesign Builders, installers and vendors.
- B. The Design Builder shall ensure that the commissioning responsibilities outlined in these specifications are included in all sub-contracts and that sub-Design Builders comply with the requirements of these specifications.
- C. The Design Builder shall ensure that each installing sub-Design Builder shall assign representatives with expertise and authority to act on behalf of the sub-Design Builder and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 - 1. Participate in construction-phase commissioning coordination meetings.
 - 2. Conduct operation and maintenance training sessions in accordance with approved training plans.
 - 3. Verify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 - 4. Evaluate commissioning issues and commissioning observations identified in the Commissioning Issues Log, field reports, test reports or other commissioning documents. In collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - 5. Review and comment on commissioning documentation.
 - 6. Participate in meetings to coordinate systems functional testing.
 - 7. Provide schedule for operation and maintenance data submittals, equipment startup, controls checkout, test and balance, and testing to Commissioning Agent for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
 - 8. Provide information to the Commissioning Agent for developing construction-phase commissioning plan.
 - 9. Participate in training sessions for USER AGENCY's operation and maintenance personnel.
 - 10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures to conduct systems functional performance testing of installed systems.
 - 11. Perform NETA acceptance testing on all electrical systems including optional tests and all NIBS performance testing on envelope systems as outlined in annex x.
 - 12. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in Division 01 Section "Operation and Maintenance Data."
 - 13. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

1.12 COMMISSIONING AGENT RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Prepare the construction phase commissioning plan.
- C. Collaborate with the Construction Manager, each Design Builder, and with subDesign Builders to develop test and inspection procedures.
- D. Include scheduled commissioning activities coordinated with overall Project schedule.
- E. Review and comment on selected submittals from the Design Builder for general conformance with the Construction Documents. Review and comment on the ability to commission the system and/or

equipment, including providing gages, controls and other components required to operate, maintain, and test the system. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the Construction Documents and User Agency's Project Requirements.

- F. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; Pre-functional Checklists, Systems Functional Performance Testing; and Project completion.
- G. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The Commissioning Agent shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
- H. Observe construction and report progress, observations and issues. Observe systems and equipment installation for adequate accessibility for maintenance and component replacement or repair, and for general conformance with the Construction Documents.
- I. Prepare Project-specific Pre-functional Checklists and Systems Functional Performance Test procedures.
- J. Coordinate Systems Functional Performance testing schedule with the Design Builder. Witness selected systems startups. Verify selected Pre-functional Checklists completed and submitted by the Design Builder. Direct, witness, and document Systems Functional Performance testing.
- K. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- L. Review and comment on operation and maintenance (O&M) documentation and systems manual outline for compliance with the Contract Documents. Operation and maintenance documentation requirements are specified in Division 01 Section "OPERATION AND MAINTENANCE DATA."
- M. Review operation and maintenance training program developed by the Design Builder. Verify training plans provide qualified instructors to conduct operation and maintenance training.
- N. Prepare commissioning reports.
- O. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.
- P. Assemble the final commissioning documentation, including the Final Commissioning Report and Addendum to the Final Commissioning Report.

1.13 COMMISSIONING DOCUMENTATION

- A. Commissioning Plan: A document, prepared by the Commissioning Agent, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
 - 2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
 - 3. Identification of systems and equipment to be commissioned.
 - 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 - 5. Identification of items that must be completed before the next operation can proceed.
 - 6. Description of responsibilities of commissioning team members.

7. Description of observations to be made.
 8. Description of requirements for operation and maintenance training, including required training materials.
 9. Description of expected performance for systems, sub-systems, equipment, and controls.
 10. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.
 11. Identification of installed systems, sub-systems, and equipment, including design changes that occurred during the construction phase.
 12. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
 13. Process and schedule for completing prestart and startup checklists for systems, sub-systems, and equipment to be verified and tested.
 14. Step-by-step procedures for testing systems, sub-systems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.
- B. Functional Performance Test Procedures: The Commissioning Agent will develop Systems Functional Performance Test Procedures for each system to be commissioned, including sub-systems, or equipment and interfaces or interlocks with other systems. Systems Functional Performance Test Procedures will include a separate entry, with space for comments, for each item to be tested. Preliminary Systems Functional Performance Test Procedures will be provided to the USER AGENCY, Bridging Architect/Engineer, and Design Builder for review and comment. The Systems Performance Test Procedure will include test procedures for each mode of operation and provide space to indicate whether the mode under test responded as required. Each System Functional Performance Test procedure, regardless of system, sub-system, or equipment being tested, shall include, but not be limited to, the following:
1. Name and identification code of tested item.
 2. Test number.
 3. Time and date of test.
 4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 5. Dated signatures of the person performing test and of the witness, if applicable.
 6. Individuals present for test.
 7. Observations and issues.
 8. Issue number, if any, generated as the result of test.
- C. Pre-functional Checklists: The Commissioning Agent will prepare Pre-functional Checklists that describe the minimum conditions necessary prior to testing. Pre-functional Checklists shall be completed and signed by the Design Builder, verifying that systems, sub-systems, equipment, and associated controls are ready for testing. The Commissioning Agent will spot-check Pre-functional Checklists to verify accuracy and readiness for testing. Inaccurate Pre-functional Checklists shall be returned to the Design Builder for correction and resubmission.
- D. Test and Inspection Reports: The Commissioning Agent will record test data, observations, and measurements on Systems Functional Performance Test Procedure forms. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
- E. Corrective Action Documents: The Commissioning Agent will document corrective action taken for systems and equipment that fail tests. The documentation will include any required modifications to systems and equipment and/or revisions to test procedures, if any. The Commissioning Agent will direct and document any retesting of systems and/or equipment requiring corrective action and document retest results.
- F. Issues Log: The Commissioning Agent will prepare and maintain Master Commissioning Issues Log that describes Commissioning Issues and Commissioning Observations that are identified during the Commissioning process. These observations and issues include, but are not limited to, those that are at variance with the Contract Documents. The Master Commissioning Issues Log will identify and track issues as they are encountered, the party responsible for resolution, progress toward resolution, and documenting how the issue was resolved. The Master Commissioning Issues Log will also track the status of unresolved and resolved issues. The issues logs will be tracked through conventional means during design and transition to web based commissioning tool for construction issues and deficiencies.
1. Creating an Issues Log Entry:

- a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
 - b. Assign a descriptive title of the issue.
 - c. Identify date and time of the issue.
 - d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
 - e. Identify system, subsystem, and equipment to which the issue applies.
 - f. Identify location of system, subsystem, and equipment.
 - g. Include information that may be helpful in diagnosing or evaluating the issue.
 - h. Note recommended corrective action.
 - i. Identify commissioning team member responsible for corrective action.
 - j. Identify expected date of correction.
 - k. Identify person documenting the issue.
 2. Documenting Issue Resolution:
 - a. Log date correction is completed or the issue is resolved.
 - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 - c. Identify changes to the OPR, BoD, or Contract Documents that may require action.
 - d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
 - e. Identify person(s) who corrected or resolved the issue.
 - f. Identify person(s) documenting the issue resolution.
- G. Final Commissioning Report: The Commissioning Agent will document results of the commissioning process, including unresolved issues, and performance of systems, sub-systems, and equipment. The Commissioning Report will indicate whether systems, sub-systems, and equipment have been completed and are performing according to the Contract Documents. The commissioning report will include the following as applicable:
1. Lists and explanations of substitutions; compromises; variances with the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report will be used by the USER AGENCY when determining that systems will be accepted. This report will be used to evaluate systems, sub-systems, and equipment and will serve as a future reference document during USER AGENCY occupancy and operation. It shall describe components and performance that exceed requirements of the Contract Documents and those that do not meet requirements of the Contract Documents. It may also include a recommendation for accepting or rejecting systems, sub-systems, and equipment.
 2. User Agency's Project Requirements prepared by the USER AGENCY
 3. Design Narrative documentation prepared and maintained by the A/E.
 4. Commissioning plan.
 5. Pre-functional Checklists completed by the Design Builder, with annotation of the Commissioning Agent review and spot-check.
 6. Systems Functional Performance Test Procedures, with annotation of test results.
 7. Commissioning Master Issues Log.
 8. Listing of deferred or off-season test(s) not performed, including the schedule for their completion.
- H. Addendum to Final Commissioning Report: The Commissioning Agent will prepare an Addendum to the Final Commissioning Report near the end of the Warranty Period. The Addendum will indicate whether systems, sub-systems, and equipment are complete and continue to perform according to the Contract Documents. The Addendum to the Final Commissioning Report shall include, but is not limited to, the following:
1. Documentation of deferred or off-season test(s) results.
 2. Completed Systems Functional Test Procedures for off-season test(s).
 3. Updated status of unresolved issues.
 4. Documentation that unresolved system performance issues have been resolved.
 5. Updated Commissioning Master Issues Log.
 6. Identification of potential Warranty Claims to be corrected by the Design Builder.
- I. Systems Manual: The Commissioning Agent will gather required information and compile the Systems Manual. The Systems Manual will include, but is not limited to, the following:
1. Final version of the User Agency's Project Requirements (User Agency provided)
 2. Final version of the Basis of Design (A/E provided)
 3. System single-line diagrams (Design Builder provided)

4. Retesting recommendations and blank test forms (CxA provided)
5. Recommended schedule for calibrating sensors and actuators (Design Builder provided)

1.14 SUBMITTALS

- A. Preliminary Construction Commissioning Plan Submittal: The Commissioning Agent will submit the Preliminary Construction Commissioning Plan. Delivery will be through electronic submission. Present submittal in sufficient detail to evaluate data collection and arrangement process. Review comments will be returned to the Commissioning Agent.
- B. Construction Commissioning Plan Final Submittal: The Commissioning Agent will submit electronically formatted information of final commissioning plan. The final submittal must address previous review comments. The final submittal shall include a copy of the preliminary submittal review comments along with a response to each item.
- C. Functional Test Procedures and Report Forms: The Commissioning Agent will submit preliminary functional test procedures and forms to the Design Builder, the USER AGENCY, and the Bridging Architect/Engineer for review and comment. The Design Builder shall return review comments to the USER AGENCY and the Commissioning Agent. The USER AGENCY and Bridging Architect/Engineer will also return review comments to the Commissioning Agent. The Commissioning Agent will incorporate review comments into the Final Functional Test Procedures to be used in Systems Functional Performance Testing.
- D. Pre-functional Checklists: The Commissioning Agent will submit Pre-functional Checklists to be completed by the Construction Manager and Design Builders through a web based commissioning tool.
- E. Test and Observation Reports: The Commissioning Agent will submit test and observation reports to the USER AGENCY with copies to the Design Builder and the Bridging Architect/Engineer.
- F. Corrective Action Documents: The Commissioning Agent will submit corrective action documents to the USER AGENCY with copies to the Design Builder and Bridging Architect.
- G. Test and Observation Reports: The Commissioning Agent will submit test and observation reports to the USER AGENCY with copies to the Design Builder and the Bridging Architect/Engineer.
- H. Commissioning Report Submittal: The Commissioning Agent will submit one hard copy and two sets of electronically formatted information of the final commissioning report to the USER AGENCY.
- I. Data for Commissioning:
 1. The Commissioning Agent will request from the Design Builder specific information needed about each piece of commissioned equipment or system to fulfill requirements of the Commissioning Plan.
 2. Typically this information will include manufacturer and model number, detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any required testing, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the USER AGENCY to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be completed and submitted to the Commissioning Agent.
 3. The Commissioning Agent may request further documentation as is necessary for the commissioning process.
 4. Much of this information will also be included with the O&M manual submittals normally submitted for the project. Typically, this information is required to be used in the commissioning process prior to the formal O&M manual submittals.

1.15 COMMISSIONING PROCESS

- A. The Commissioning Agent shall be responsible for the overall management of the commissioning process as well as the specific scheduling of all procedures.
- B. Prior to the start of mechanical or electrical system installation, the Design Builder shall designate a specific individual as the Commissioning Manager (CxM) to manage and lead the commissioning effort on behalf of the Design Builder. The CxM shall provide a single point of contact and communications for all commissioning related services.
- C. Prior to the start of mechanical or electrical system installation, the Design Builder shall designate specific individuals as commissioning representatives (CxR) for each SubDesign Builder to be associated with commissioning work. The commissioning representatives shall participate in the

commissioning process as team members providing commissioning testing services, equipment operation, adjustments, and corrections if necessary. All CR's shall be selected as individuals having sufficient authority to direct their respective staff to provide the services required, accept and provide minor changes to the work on behalf of the sub-Design Builders or various organizations involved, and to speak on behalf of their organizations in all commissioning related contractual matters

1.16 QUALITY ASSURANCE

- A. Instructor Qualifications: Factory-authorized service representatives experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- B. Test Equipment Provisions and Calibration: Design Builders shall provide test instrumentation required to complete testing and comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within eleven months prior to use with NIST calibration certificate.

1.17 COORDINATION

- A. Management: The Commissioning Agent will direct and coordinate the commissioning activities and the commissioning reports to the USER AGENCY. All commissioning team members shall work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.
- B. Scheduling: The Commissioning Agent will work with the Design Builder and the USER AGENCY to schedule the commissioning activities. The Commissioning Agent will provide sufficient notice to the Design Builder and the USER AGENCY for scheduling commissioning activities. The Design Builder shall integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
- C. Coordinating Meetings: The Commissioning Agent will conduct periodic coordination meetings of the commissioning team to review progress on commissioning activities, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- D. Pretesting Meetings: The Commissioning Agent will conduct pretest meetings of the commissioning team to review startup reports, Pre-functional Checklist results, Systems Functional Performance Testing procedures, testing personnel and instrumentation requirements.
- E. Systems Functional Performance Testing Coordination: The Commissioning Agent will coordinate the sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. The Commissioning Agent will coordinate the schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. The Design Builder shall provide all standard and specialized testing equipment required to perform startup, initial checkout, specification defined tests, industry standards tests, and Systems Functional Performance Testing. Required test equipment for Functional Performance Testing will be identified in the detailed System Performance Test Procedure checklists prepared by the Commissioning Agent.
- B. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications or Guiding Standards. All equipment shall be NIST calibrated within 12 months.
- C. The Design Builder shall provide all test equipment or hire a third party testing agency to perform all inspections and tests defined in NETA ATS Standard for Acceptance Testing for Electrical Power Equipment and Systems including those listed as optional. This includes supply any secondary equipment such as load banks.
- D. The Design Builder shall provide all test equipment or hire a third party testing agency to perform all inspections and tests defined in NIBS Guideline 3 Building Enclosure Commissioning Process BECx Annex U (Exterior Building Enclosure Performance Testing).

- E. Data logging equipment and software required to test equipment shall be provided by the Design Builder.

PART 3 - EXECUTION

3.1 START-UP, PRE-FUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

The following procedures shall apply to all equipment and systems being commissioned. Refer to Part 1, Systems To Be Commissioned.

- A. Pre-functional Checklists are important to ensure that the equipment and systems are hooked up and operational. These ensure that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment shall receive a full Pre-functional Checklist checkout. No sampling strategies are used. The Pre-functional Checklist for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
 - 1. The Commissioning Agent shall develop Pre-functional Checklists and procedures after final approval of equipment submittals. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.
 - 2. The Design Builder shall determine which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.
 - 3. The Pre-functional Checklists will be documented electronically through a web-based system. The CxA will short training session to walk the Design Builders through the system.
- B. Start-up and Initial Checkout Plan: The Design Builder shall develop detailed start-up plans for all equipment. The primary role of the Design Builder in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for Pre-functional Checklists and startup shall be identified in coordination meetings and in the checklist forms.
 - 1. The Commissioning Agent will assist the Design Builder in development of the full start-up plan. The Design Builder shall combine the checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual data and the normally used field checkout sheets. The plan shall include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.
 - 2. The full start-up plan shall at a minimum consist of the following items:
 - a. The Pre-functional Checklists.
 - b. The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 - c. The manufacturer's normally used field checkout sheets.
 - d. The Design Builder shall submit the full startup plan to the Commissioning Agent for review and approval.
 - e. The Design Builder shall review and evaluate the procedures and the format for documenting them, noting any procedures that need to be revised or added.
- C. Execution of Pre-functional Checklists and Startup
 - 1. Four weeks prior to startup, the Design Builder shall schedule startup and checkout with the User Agency and CxA. The performance of the Pre-functional Checklists, startup and checkout shall be directed and executed by the Design Builder.
 - 2. The Commissioning Agent will observe the startup procedures for selected pieces of primary equipment.
 - 3. The Design Builder shall execute startup and provide the USER AGENCY and Commissioning Agent with a signed and dated copy of the completed start-up, Pre-functional Checklists, and initial tests.
 - 4. Only individuals that have direct knowledge and witnessed that a line item task on the Pre-functional Checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

3.2 PHASED COMMISSIONING

- A. The project may require startup and initial checkout to be executed in phases. This phasing shall be planned and scheduled in a coordination meeting of the USER AGENCY, Commissioning Agent, and

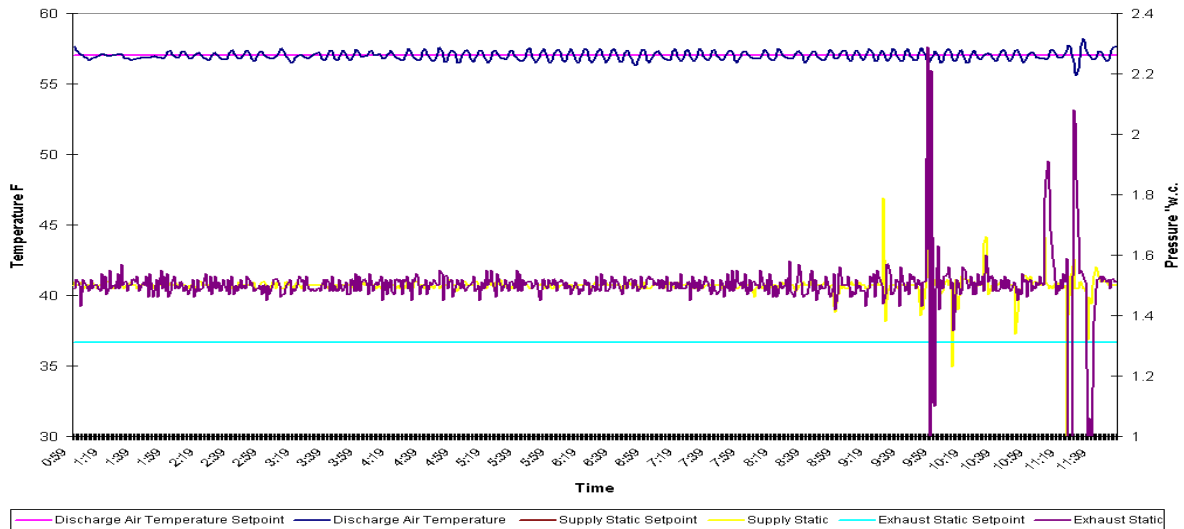
the Design Builder. Results will be added to the master construction schedule and the commissioning schedule.

3.3 INTEGRATED AUTOMATION AND TEMPERATURE CONTROLS

- A. The BAS Technician provided shall be thoroughly trained in the programming and operation of the controller and workstation software. If the BAS Technician provided cannot perform every software task requested by the Cx agent in a timely fashion, the Design Builder shall provide additional qualified personnel at the Project Site as requested by the Cx agent.
- B. All setpoints, operating parameters, airflows, and outputs should be user adjustable through the operator's workstation or human machine interface.
- C. Provide a wireless internet network in the building for use during controls programming, checkout, and commissioning. This network will allow project team members to more effectively program, view, manipulate and test control devices while being in the same room as the controlled device.
- D. Provide web-access to the commissioning agent for remote viewing and monitoring of the automation system prior to functional performance testing.
- E. Provide graphical trending through the automation control system of systems being commissioned. Trending requirements will be dictated by the CxA and included within a trend plan and/or determined while execution of testing. Trending shall occur before, during and after functional testing. The Design Builder shall be responsible for producing graphical representations of the trended points that show each system operating properly during steady state conditions as well as during the functional tests. These graphical reports and data backup shall be submitted to the CxA for review and analysis before, during dynamic operation, and after functional testing. Default trend sample rates shall be 1 minute interval. The Design Builder shall provide the means to trend all points at this interval and schedule automatic server downloads so data is not overwritten.
- F. The graphical plots shall be provided with a dual y-axis allowing up to 15 trend points (series) plotted simultaneously with each series in distinct color. The plots will further require title, axis naming, legend etc. all dictated by the CxA. If this cannot be sufficiently accomplished directly in the automation system then it is the responsibility of the Design Builder to plot these trend logs in Microsoft Excel at the direction of the CxA. The following table and graph is a reference sample similar to what will be expected for this project.

****SAMPLE FOR REFERENCE****

Trend Log #1: Temperature & Pressure	
Data Collection Frequency	1 minute
Trend Log Duration	1 week
Trend Log Start Date/Time	Minimum 1 day before test
Trend Log Stop Date/Time	Minimum 5 days after test
Point #1	Discharge Air Temperature
Point #2	Discharge Air Temperature Setpoint
Point #3	Supply Static Pressure
Point #4	Supply Static Pressure Setpoint
Point #5	Return Static Pressure
Point #6	Return Static Pressure Setpoint



G. Sensor and Actuator Calibration

1. All automation system inputs including sensors that are factory calibrated shall be validated once field installed with test instrumentation provided by the Design Builder. (See section 2.1) The test instruments shall be NIST calibrated with proof of certificate within the past 12 months and record documented in the point to point validation worksheets provided at the end of this specification section.
2. All automation system outputs shall be validated after installation against the automation system and calibrated as needed by the Design Builder. This shall include open, closed, and mid-point conditions for actuators, on/off for digital outputs and signal output at minimum.
3. All procedures used shall be fully documented on the forms provided at the end of this section, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.

H. Sensor and Actuator Calibration Maintenance Requirements

1. A sensor and actuator calibration table listing and referencing the location of procedures to follow in the O&M manuals, and the frequency at which calibration should be performed for all sensors/actuators, separated by system, sub-system, and type. The calibration requirements shall be submitted both in the O&M manuals and separately in a standalone document containing all sensors for inclusion in the commissioning documentation.
2. The sensor calibration documentation used shall be fully documented on the forms provided at the end of this section, clearly referencing sensor type, frequency, and procedures to be followed specific to the location in the operations and maintenance manuals.

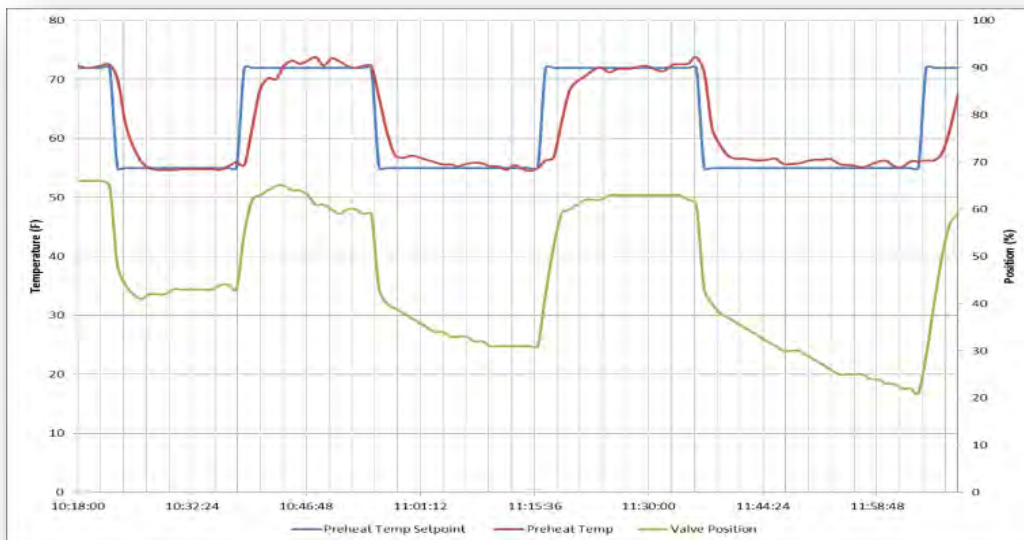
I. Performance Criteria

1. The Design Builder will provide control responsiveness and attributes within the following ranges unless more stringent requirements are detailed in other specification sections.
 - a. Steady State Setpoint Tolerances
 - (1) Zone / space temperature control: ± 0.5 °F
 - (2) Zone / space humidity control: $\pm 2\%$ RH
 - (3) Zone / space static pressure control: ± 0.02 inH₂O
 - (4) Supply air temperature control: ± 0.5 °F
 - (5) Supply air humidity control: $\pm 5\%$ RH
 - (6) Return air humidity control: $\pm 2\%$ RH
 - (7) Duct static pressure control: ± 0.05 inH₂O
 - (8) Air flowrate control: $\pm 5\%$ of setpoint
 - (9) Water temperature control: ± 1.0 °F
 - (10) Water differential pressure: ± 0.5 psig
 - (11) Water flowrate control: $\pm 2\%$ of setpoint
 - b. Overshooting and Stability
 - (1) On transitions or setpoint changes the controls shall be tuned to provide both a stable output and control point generally following a quarter decay response.

Overshoots shall not exceed 300% of the setpoint tolerances for supply air and duct pressure. Zone responses shall not overshoot beyond the setpoint tolerances.

J. Loop Tuning and Operational Tests

1. PID Loop tuning shall be documented for all control loops by providing a trend log graphical plot with excel data backup for all control loops in the automation system. There trend log series shall include the control input, set point, and control output. Loop output cycling under a steady load condition shall be within the tolerances defined in previous section. The maximum allowable interval sampling rate is one minute however, the most frequent available trend sample rate of the automation system shall be used.
2. The loop operational test shall be performed by the contract for all systems interfaced into the building automation system. If a piece of equipment or system has provided packaged controls it is still the responsibility to perform these tests however correction of tuning is the responsibility of the Design Builder providing the controls.
3. On equipment or systems of the same size where the control loops are common having the same PID constants, the Design Builder can perform the testing on one of the equipment or systems for demonstration as long as all are tuned the same after the test.
4. If any of the loop operational tests are deemed not acceptable by the CxA or A/E additional tuning shall occur and the testing repeated until they are satisfactory to both the CxA and A/E.
5. Provide positive and negative "bump" tests demonstrating loop stability by raising and lowering loop set points. A general sequence of events is as follows:
 - a. Trend logs and the graphical plots are setup.
 - b. The system is allowed to operate in steady state for 5 minutes prior to the start of the test.
 - c. Provide a setpoint change to initiate a step increase "bump".
 - d. Allow the system time to respond and settle within the defined tolerance for 5 minutes. (The duration time starts when the control no longer cycles out of the defined tolerance).
 - e. Provide a setpoint change to initiate a step decrease "bump".
 - f. Allow the system time to respond and settle within the defined tolerance for 5 minutes. (The duration time starts when the control no longer cycles out of the defined tolerance).
 - g. Repeat steps c through f one additional time.
 - h. Plot graph and save excel data for transfer to the CxA and A/E.
 - i. The following plot is an example of the graph layout that will be required.



K. Additional Loop Tuning Documentation

1. Provide the following documentation after loop tuning has been completed.
2. Loop tuning documentation and constants for each loop of the building systems. The documentation shall be submitted in outline or table separated by system, control type (e.g. heating valve temperature control); proportional, integral and derivative constants, interval (and bias if used) for each loop. The following table is a sample that can be used as a template for submission.

AIR HANDLING UNIT AHU-1 (Example)				
Control Reference	Proportional Constant	Integral Constant	Derivative Constant	Interval
Heating Valve Output	1000	20	10	2 sec.

3. Sensor Calibration Document
 - a. Provide a sensor calibration table listing the referencing the location of procedures to following in the O&M manuals, and the frequency at which calibration should be performed for all sensors, separated by system, subsystem, and type. The calibration requirements shall be submitted both in the O&M manuals and separately in a standalone document containing all sensors for inclusion in the commissioning documentation. The following table is a sample that can be used as a template for submission.

AIR HANDLING UNIT AHU-1 (Example)		
Sensor	Calibration Frequency	O&M Calibration Procedure Reference
Discharge air temperature	Once a year	Volume I Section D.3.aa
Discharge static pressure	Every 6 months	Volume II Section A.1.c

3.4 FUNCTIONAL PERFORMANCE TESTING AND BUILDING ENVELOPE TESTING

- A. This paragraph applies to commissioning Systems Functional Performance Testing of equipment and systems for all referenced specification Divisions.
- B. Objectives and Scope: The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Successful Completion of Functional Testing is a Prerequisite to Substantial Completion. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems. In general, each system shall be operated through all modes of operation where there is a specified system response. The Design Builder shall verify each sequence in the sequences of operation.
- C. Development of Functional Performance Test Procedures: Before Systems Functional Performance Test procedures are written, the Design Builder shall submit all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements found in the Contract Documents and approved submittals and shop drawings, the Commissioning Agent will develop specific systems functional test procedures and forms to verify and document proper operation of each piece of equipment and system to be commissioned. The Design Builder shall assist the Commissioning Agent in developing the Systems Functional Performance Test procedures as requested by the Commissioning Agent i.e. by answering questions about equipment, operation, sequences, etc. Prior to execution, the Commissioning Agent will provide a copy of the Systems Functional Performance Test procedures to the USER AGENCY, the Bridging Architect/Engineer, and the Design Builder, who shall review the tests for feasibility, safety, equipment and warranty protection.
- D. Purpose of Test Procedures: The purpose of each specific Systems Functional Performance Test is to verify and document compliance with the stated criteria of acceptance given on the test form. Representative test formats and examples are found in the Commissioning Plan for this project. (The Commissioning Plan is issued as a separate document and is available for review.)
- E. Test Methods: Systems Functional Performance Testing shall be achieved by manual testing (i.e. persons manipulate the equipment and observe performance) and/or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The Commissioning Agent shall determine which method is most appropriate for tests that do not have a method specified.
 1. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed as determined by the CxA, though timing the testing to experience actual conditions is encouraged wherever practical.
 2. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed as determined by the Commissioning Agent, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the

interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

3. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
4. Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the Air Conditioning compressor lockout initiate at an outside air temperature below 12 C (54 F), when the outside air temperature is above 12 C (54 F), temporarily change the lockout setpoint to be 2 C (4 F) above the current outside air temperature.
5. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification shall be completed during system readiness testing.
6. Setup: Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Design Builder shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Design Builder shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.
7. Sampling: No sampling is allowed in completing Pre-functional Checklists. Sampling may be allowed for functional test procedures execution if noted in the Cx Plan. The CxA shall determine the sampling rate however the Design Builder should expect to test at 100%. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the Design Builder to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units. Costs associated with testing expanded samples and/or all equipment or systems of the specified type are the responsibility of the Design Builder.
8. Cost of Expanded Sample Testing: The costs including CxA labor and expenses for expanded sample System Functional Performance Test shall be solely the responsibility of the Design Builder. Any required expanded sample testing by the Design Builder shall not be considered a justified reason for a claim of delay or for a time extension by the Design Builder.
9. Coordination and Scheduling: The Design Builder shall provide sufficient notice to the CxA and User Agency regarding the completion schedule for the Pre-functional Checklists and startup of all equipment and systems. The CxA shall schedule functional tests through the Design Builder and User Agency. The CxA shall direct, witness and document the functional testing of equipment and systems. The Design Builder shall execute the tests.
10. Testing Pre-Requisites: In general, functional testing shall be conducted after system readiness testing and startup has been satisfactorily completed. The control system shall be sufficiently tested and approved by the Commissioning Agent and the User Agency before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing shall be completed and debugged before functional testing of air-related or water-related equipment or systems. The Design Builder shall provide the following documentation prior to scheduling functional testing activities.
 - a. Equipment static test reports using the cover page provided at the end of this specification.
 - b. Equipment startup reports using the cover page provided at the end of this specification.
 - c. Point-to-Point checkout documentation
 - d. Sensor / Input calibration verification record using the form provided at the end of this specification.
 - e. Actuator / Output calibration verification record using the form provided at the end of this specification.
 - f. A sensor calibration table listing the referencing the location of procedures to following in the O&M manuals, and the frequency at which calibration should be performed for all sensors, separated by system, subsystem, and type. The calibration requirements shall be submitted both in the O&M manuals and separately in a standalone document containing all sensors for inclusion in the commissioning documentation. The following table is a sample that can be used as a template for submission.

AIR HANDLING UNIT AHU-1 (Example)		
Sensor	Calibration Frequency	O&M Calibration Procedure Reference
Discharge air temperature	Once a year	Volume I Section D.3.aa
Discharge static pressure	Every 6 months	Volume II Section A.1.c

- g. Loop tuning documentation and constants for each loop of the building systems. The documentation shall be submitted in outline or table separated by system, control type (e.g. heating valve temperature control); proportional, integral and derivative constants, interval (and bias if used) for each loop. The following table is a sample that can be used as a template for submission.

AIR HANDLING UNIT AHU-1 (Example)				
Control Reference	Proportional Constant	Integral Constant	Derivative Constant	Interval
Heating Valve Output	1000	20	10	2 sec.

11. Problem Solving: The Commissioning Agent shall recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the Design Builder.

3.5 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

- A. Documentation: The Commissioning Agent will direct, witness, and document the results of all Systems Functional Performance Tests using the specific procedural forms developed by the Commissioning Agent for that purpose. Prior to testing, the Commissioning Agent will provide these forms to the USER AGENCY and the Design Builder for review and approval. The Design Builder shall include the filled out forms with the O&M manual data.
- B. Non-Conformance: The Commissioning Agent will record the results of the Systems Functional Performance Tests on the procedure or test form. All items of non-conformance issues will be noted and reported to the USER AGENCY on Commissioning Field Reports and/or the Commissioning Master Issues Log.
1. Corrections of minor items of non-compliance identified may be made during the tests at the discretion of the Commissioning Agent. In such cases, the item of non-compliance and resolution shall be documented on the Systems Functional Test Procedure form.
 2. Every effort shall be made to expedite the systems functional performance testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the Commissioning Agent will not be pressured into overlooking non-compliant work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so by direction from the USER AGENCY.
 3. As the systems functional performance tests progress and an item of non-compliance is identified, the Commissioning Agent shall discuss the issue with the Design Builder and the USER AGENCY.
 4. When there is no dispute on an item of non-compliance, and the Design Builder accepts responsibility to correct it:
 - a. The Commissioning Agent will document the item of non-compliance and the Design Builder's response and/or intentions. The Systems Functional Performance Test then continues or proceeds to another test or sequence. After the day's work is complete, the Commissioning Agent will submit a Commissioning Field Report to the USER AGENCY. The Commissioning Agent will also note items of non-compliance and the Design Builder's response in the Master Commissioning Issues Log. The Design Builder shall correct the item of non-compliance and report completion to the USER AGENCY and the Commissioning Agent.
 - b. The need for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Design Builder shall reschedule the test and the test shall be repeated.
 5. If there is a dispute about item of non-compliance, regarding whether it is an item of non-compliance, or who is responsible:
 - a. The item of non-compliance shall be documented on the test form with the Design Builder's response. The item of non-compliance with the Design Builder's response shall

- also be reported on a Commissioning Field Report and on the Master Commissioning Issues Log.
- b. Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive and acceptance authority is with the USER AGENCY.
 - c. The Commissioning Agent will document the resolution process.
 - d. Once the interpretation and resolution have been decided, the Design Builder shall correct the item of non-compliance, report it to the Commissioning Agent. The requirement for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Design Builder shall reschedule the test. Retesting shall be repeated until satisfactory performance is achieved.
- C. **Cost of Retesting:** The cost to retest any portion of a Functional Performance Test or to validate deficiency resolution of issues shall be solely the responsibility of the Design Builder including the costs for the Commissioning Agent time and expenses. Any required retesting by the Design Builder shall not be considered a justified reason for a claim of delay or for a time extension by the Design Builder.
- D. **Failure Due to Manufacturer Defect:** If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the User Agency. In such case, the Design Builder shall provide the USER AGENCY with the following:
1. Within one week of notification from the USER AGENCY, the Design Builder or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the User Agency within two weeks of the original notice.
 2. Within two weeks of the original notification, the Design Builder or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 3. The USER AGENCY shall determine whether a replacement of all identical units or a repair is acceptable.
 4. Two examples of the proposed solution shall be installed by the Design Builder and the USER AGENCY shall be allowed to test the installations for up to one week, upon which the USER AGENCY will decide whether to accept the solution.
 5. Upon acceptance, the Design Builder and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
 6. **Approval:** The CxA shall note each satisfactorily demonstrated function on the test form. Formal approval of the functional test shall be made later after review by the CxA and by the User Agency. The CxA shall evaluate each test and report to the User Agency using a standard form. The User Agency shall give final approval on each test using the same form, and provide signed copies to the CxA and the Design Builder.
- E. **DEFERRED TESTING**
1. **Unforeseen Deferred Functional Performance Tests:** If any check or Functional Performance Test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the User Agency. These tests shall be conducted in the same manner as the seasonal tests as soon as possible.
 2. **Seasonal Functional Performance Testing:** Deferred Seasonal Systems Functional Performance Tests are those that must be deferred until weather conditions are closer to the systems design parameters. The Commissioning Agent will review systems parameters and recommend which Systems Functional Performance Tests should be deferred until weather conditions more closely match systems parameters. The Design Builder shall review and comment on the proposed schedule for Deferred Seasonal Testing. The USER AGENCY will review and approve the schedule for Deferred Seasonal Testing. Deferred Seasonal Systems Functional Performances Tests shall be directed, witnessed, and documented by the Commissioning Agent. Deferred Seasonal Systems Functional Performance Tests shall be executed by the Design Builder in accordance with these specifications.
- F. **OPERATION AND MAINTENANCE TRAINING REQUIREMENTS**
1. **Training Preparation Conference:** Before operation and maintenance training, the Commissioning Agent will convene a training preparation conference to include USER AGENCY,

USER AGENCY's Operations and Maintenance personnel, and the Design Builder. The purpose of this conference will be to discuss and plan for Training and Demonstration of USER AGENCY Operations and Maintenance personnel.

2. The Design Builder shall provide training and demonstration as required throughout the Contract Documents. The Training and Demonstration shall include, but is not limited to, the following:
 - a. Review the Contract Documents
 - b. Review installed systems, subsystems, and equipment.
 - c. Review instructor qualifications.
 - d. Review instructional methods and procedures.
 - e. Review training module outlines and contents.
 - f. Review course materials (including operation and maintenance manuals).
 - g. Inspect and discuss locations and other facilities required for instruction.
 - h. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
 - i. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
3. Training Modules: The Design Builder shall submit the following information to the USER AGENCY and the Commissioning Agent:
 - a. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module. At completion of training, submit two complete training manuals for USER AGENCY's use.
 - b. Qualification Data: Submit qualifications for facilitator and/or instructor.
 - c. Attendance Record: For each training module, submit list of participants and length of instruction time.
 - d. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.
 - e. Demonstration and Training Recording:
 - (1) General: Engage a qualified commercial photographer to record demonstration and training. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training module, record each chart containing learning objective and lesson outline.
 - (2) Video Format: Provide high quality color DVD color on standard size DVD disks.
 - (3) Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
 - (4) Narration: Describe scenes on video recording by audio narration by microphone while demonstration and training is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - (5) Submit two copies within seven days of end of each training module.
 - (6) Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding videotape. Include name of Project and date of videotape on each page.
 - (7) Contents:
 - (a) Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - (i) System, subsystem, and equipment descriptions.
 - (ii) Performance and design criteria if Design Builder is delegated design responsibility.
 - (iii) Operating standards.
 - (iv) Regulatory requirements.
 - (v) Equipment function.
 - (vi) Operating characteristics.
 - (vii) Limiting conditions.
 - (viii) Performance curves.
 - (b) Documentation: Review the following items in detail:
 - (i) Emergency manuals.

- (ii) Operations manuals.
 - (iii) Maintenance manuals.
 - (iv) Project Record Documents.
 - (v) Identification systems.
 - (vi) Warranties and bonds.
 - (vii) Maintenance service agreements and similar continuing commitments.
 - (c) Emergencies: Include the following, as applicable:
 - (i) Instructions on meaning of warnings, trouble indications, and error messages.
 - (ii) Instructions on stopping.
 - (iii) Shutdown instructions for each type of emergency.
 - (iv) Operating instructions for conditions outside of normal operating limits.
 - (v) Sequences for electric or electronic systems.
 - (vi) Special operating instructions and procedures.
 - (d) Operations: Include the following, as applicable:
 - (i) Startup procedures.
 - (ii) Equipment or system break-in procedures.
 - (iii) Routine and normal operating instructions.
 - (iv) Regulation and control procedures.
 - (v) Control sequences.
 - (vi) Safety procedures.
 - (vii) Instructions on stopping.
 - (viii) Normal shutdown instructions.
 - (ix) Operating procedures for emergencies.
 - (x) Operating procedures for system, subsystem, or equipment failure.
 - (xi) Seasonal and weekend operating instructions.
 - (xii) Required sequences for electric or electronic systems.
 - (xiii) Special operating instructions and procedures.
 - (e) Adjustments: Include the following:
 - (i) Alignments.
 - (ii) Checking adjustments.
 - (iii) Noise and vibration adjustments.
 - (iv) Economy and efficiency adjustments.
 - (f) Troubleshooting: Include the following:
 - (i) Diagnostic instructions.
 - (ii) Test and inspection procedures.
 - (g) Maintenance: Include the following:
 - (i) Inspection procedures.
 - (ii) Types of cleaning agents to be used and methods of cleaning.
 - (iii) List of cleaning agents and methods of cleaning detrimental to product.
 - (iv) Procedures for routine cleaning
 - (v) Procedures for preventive maintenance.
 - (vi) Procedures for routine maintenance.
 - (vii) Instruction on use of special tools.
 - (h) Repairs: Include the following:
 - (i) Diagnosis instructions.
 - (ii) Repair instructions.
 - (iii) Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - (iv) Instructions for identifying parts and components.
 - (v) Review of spare parts needed for operation and maintenance.
4. Quality Insurance:
- a. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
 - b. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

- c. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.
 - d. Design Builder Coordination:
 - e. Coordinate instruction schedule with USER AGENCY's operations. Adjust schedule as required to minimize disrupting USER AGENCY's operations.
 - f. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
 - g. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the USER AGENCY.
5. Training Execution:
 - a. Preparation: Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Set up instructional equipment at instruction location.
 - b. Instruction:
 - c. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Design Builder and USER AGENCY for number of participants, instruction times, and location.
 - d. Instructor: Engage qualified instructors to instruct USER AGENCY's personnel to adjust, operate, and maintain systems, sub-systems, and equipment not part of a system.
 6. Scheduling: Provide instruction at mutually agreed times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with the USER AGENCY and the Commissioning Agent with at least seven days' advance notice.
 7. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, or a written, performance-based test.
 8. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.
- G. OPERATION AND MAINTENANCE MANUALS
1. Submission of Operations and Maintenance Data: Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Division 01 requirements for closeout submittals, operations and maintenance data, and project record documents.
 2. Package Quality: Documents must be fully legible. Poor quality copies and material with hole-punches obliterating the text or drawings will not be accepted. Documents shall be written in English language.
 3. Package Content: Data package content shall be as shown in the paragraph titled "Schedule of Operation and Maintenance Data Packages." Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission.
 4. Changes to Submittals: Manufacturer-originated changes or revisions to submitted data shall be furnished by the Design Builder if a component of an item is so affected subsequent to acceptance of the O&M Data. Changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data, shall be submitted by the Design Builder within 30 calendar days of the notification of this change requirement.
 5. Schedule of Operations and Maintenance Manual Packages: Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:
 - a. First Submission: The first submission of O&M Manuals shall be made within 4 weeks after approval of equipment submittals. This submission shall include the Table of Contents, divider tabs, and approved submittal data arranged in accordance with the requirements provided in paragraph C above.
 - b. Second Submission: The second submission shall be made at least 6 weeks prior to scheduled functional performance testing and/or scheduled Design Builder's training, whichever is earlier. The second submission shall include all required Operations & Maintenance data as described in the specifications.
 6. CxA Review and Approval: Prior to substantial completion, the CxA may review the O&M manual data, documentation and redlined as-builds for equipment and systems that were commissioned to verify compliance with the O&M documentation requirements of the

specifications. The CxA shall communicate deficiencies in the manuals to the User Agency. Upon a successful review of the corrections, the CxA shall recommend approval and acceptance of these sections of the O&M manuals to the User Agency. The CxA shall also review each equipment warranty and verify that all requirements to keep the warranty valid are clearly stated. This work does not supersede the normal review requirement of the O&M manual data as indicated elsewhere in the specifications.

H. MAINTENANCE AND OPERATIONS ACCEPTANCE

1. The Commissioning Functional Performance Tests shall be successfully completed prior to Substantial Completion. However, should mechanical and electrical systems be in use prior to Substantial Completion:
2. The Design Builder shall be responsible for the operation of all systems and all adjustments necessary to successfully pass the Functional Performance Test Procedures.
3. The Design Builder shall document and respond to all concerns and questions from building occupants in a timely and professional manner.
4. Maintenance and operational acceptance is a requirement of final completion and must be documented prior to submitting the Final Application for Payment.

PART 4 - COMMISSIONING DOCUMENTATION ATTACHMENTS

- A. Training Cover Page: Training agendas shall be submitted for review and approval with this cover page completed. See the requirements for training in this specification section for information to provide with this coversheet.
- B. Static Tests and Startup Cover Page: Design Builder's static test reports and startup reports shall be submitted for review with this cover page completed.
- C. Sensor Calibration Record: This document shall be filled out by the Design Builder for all sensors. See specification requirements specific to this documentation.
- D. Actuator Calibration Record: This document shall be filled out by the Design Builder for all actuators. See specification requirements specific to this documentation.
- E. Sensor and Actuator Calibration Maintenance Report: This document shall be filled out by the Design Builder for all sensors and actuators. See specification requirements specific to this documentation.
- F. Pre-functional Checklist and Functional Performance Tests: A preliminary PFC and FPT is attached to this section to illustrate level of rigor and general execution techniques. Additional checklists and test procedures will be incorporated during the project based on the systems being commissioned. Modifications, additions and deletions will be performed to customize these documents for the field installed equipment and systems. These incorporations will not be considered an additional service or basis for change orders nor will modifications to the preliminary checklists and test procedures which are included for the bidding Design Builders benefit.

Training Conducted By:

Videographer:	
----------------------	--

Attendees Sign-In	
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Acceptance of Training by User Agency:
--

Name: _____ Date: _____

Training Evaluation Worksheet

Project: _____

Date: _____

Subject: _____

Section: _____

This form is used to evaluate each training session. Based upon this evaluation, later sessions can be improved.

****Rankings: 1=Very Well --- 5=Not At All Mark questions that are not applicable with N/A.****

- | | | | | | | | |
|-----|--|---|---|---|---|---|-----|
| 1. | How were the objectives of this training session met? | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. | Do you know where the components/systems are located? | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. | Do you know what area the components/systems are serving? | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. | Do you understand the various types and purpose of these components/systems? | 1 | 2 | 3 | 4 | 5 | N/A |
| 5. | Do you understand/know how to systematically troubleshoot common problems with these components/systems? | 1 | 2 | 3 | 4 | 5 | N/A |
| 6. | Do you know how the components/systems operate under all normal modes? | 1 | 2 | 3 | 4 | 5 | N/A |
| 7. | How well do you understand the importance of meeting the design intent for the systems covered? | 1 | 2 | 3 | 4 | 5 | N/A |
| 8. | Are you able to efficiently find the relevant information in the Systems Manual to operate and maintain the systems/components you were trained for in this session? | 1 | 2 | 3 | 4 | 5 | N/A |
| 9. | Do you know how to perform the needed maintenance on the equipment and/or do you know to get the information you need? | 1 | 2 | 3 | 4 | 5 | N/A |
| 10. | Do you know how to get updated technical service information for the components/systems? | 1 | 2 | 3 | 4 | 5 | N/A |
| 11. | Explain why any questions got very low or very high ratings from you:

_____ | | | | | | |
| 12. | What topics would you desire to be covered that were absent from this training session?

_____ | | | | | | |
| 13. | You may provide other comments concerning anything about this training session (e.g., information prior to training, content):

_____ | | | | | | |

Attendee Signature: _____

Startup / Static Test Cover Sheet

Project:

Spec Section:

Test Type:

Equipment:

Installing Design Builder:

Company:

Phone:

Name:

Email:

Testing Conducted by:

Company:

Phone:

Name:

Email:

Test Procedure Overview

Results Overview

Acceptance of Training by User Agency:

The training provided was satisfactory and delivered the knowledge required to operate and maintain the equipment discussed during the training session.

Name:

Date:

Instrument Manufacturer: _____

Instrument Model: _____

Instrument Serial No: _____

[illegible]

Remarks

TEST DATE:

BY: _____

Actuator Calibration Record

Project: _____

Instrument Manufacturer: _____

Building: _____

Instrument Model: _____

Reference: _____

Instrument Serial No: _____

System	Actuator	Type	Command	Actual	BAS Reading	Calibrated (Y/N)

Remarks

TEST DATE: _____

BY: _____

[illegible]

DIVISION 02 - EXISTING CONDITIONS
Section 024119 - Selective Demolition

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 31 10 00 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: Refer to Section 01 81 13 "Sustainable Design Requirements."
- B. Qualification Data: For refrigerant recovery technician.
- C. Engineering Survey: Submit engineering survey of condition of building.
- D. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- E. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Using Agency's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Using Agency 's continuing occupancy of portions of existing building and of Using Agency 's partial occupancy of completed Work.
- F. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Construction Photographs." Submit before Work begins.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- H. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Using Agency as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Using Agency 's operations.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIALS REQUIREMENTS

- A. Refer to Section 01 81 13 "Sustainable Design Requirements" for sustainable design materials requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

3. EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, or video and templates.
 - 1. Comply with requirements specified in Section 01 32 33 "Construction Photographs."
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Utilities."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 07 54 16 "PVC-KEE Roofing" for new roofing requirements.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END 02 41 19

1. GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stone masonry anchored to concrete backup.

A. Related Requirements:

1. Section 07 21 00 "Thermal Insulation" for wall cavity insulation.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.

B. Samples for Verification:

1. For each stone type indicated. Include at least four Samples in each set and show the full range of color and other visual characteristics in completed Work.
2. For each color of mortar required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Qualification Data: For Installer.

- C. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, supply sources, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.

1. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents contained in mockups unless Architect approves such deviations in writing.

D. Material Test Reports:

1. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Architect shall review proposed configuration of mockup, prior to starting construction.
 - 2. Build mockups for saw cut finish stone, in sizes approximately 60 inches long by 60 inches high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches long in mockup.
 - b. Include through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit stone masonry above half of flashing).
 - c. Include up-lighting as indicated on Drawings and as required for review of mockups in night condition.
 - 3. Protect accepted mockups from the elements with weather-resistant membrane.
 - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Sealant Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Section 07 92 00 "Joint Sealants," Samples of materials that will contact or affect joint sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, in a dry location, or in covered weatherproof dispensing silos.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining stone masonry face.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter using coverings spread on the ground and over the wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1.9 COORDINATION

- A. Advise installers of adjacent Work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.
- B. Coordinate locations of dovetail slots installed in concrete that are to receive stone anchors.
- C. Coordinate all inlets and daylighted drains/scuppers into the coursing.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations for Stone: Obtain stone, regardless of finish, from single quarry with resources to provide materials of consistent quality in appearance and physical properties.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.

2.3 STONE

- A. Stone Species, Finishes, and Suppliers: Subject to compliance with requirements, provide stone matching Architect's samples, which have been selected from the product lines, suppliers, and quarriers indicated.
- B. Provide matched blocks from a single quarry for each type, specie, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.
- C. Visual Performance Criteria: All portions of stonework shall be furnished complying with the following criteria, all as reviewed and accepted by the Architect through sample submissions, sample installations, and thereafter on-site observations:
 - 1. Color Range: Matching Architect's samples; uniform with no discernable variations between pieces in any contiguous area.
 - 2. Finishing Technique: Match Architect's samples.

2.4 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.
 - 1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in stone masonry mortar.
- E. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight.
- F. Aggregate: ASTM C 144 and as follows:

1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.
2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
 - a. Match Architect's sample.

G. Water: Potable.

2.5 VENEER ANCHORS

A. Materials:

1. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
2. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

B. Size: Sufficient to extend at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.

C. Adjustable Masonry-Veneer Anchors: Provide thermally broken anchors.

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.078-inch-thick, stainless-steel sheet.
3. Fabricate wire connector sections from 0.187-inch-diameter, stainless-steel wire.
4. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.

D. Adjustable, Screw-Attached Veneer Anchors: Provide thermally broken anchors. Units consisting of a wire tie section and a metal anchor section for attachment to concrete or metal studs

1. Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing screw to seat directly against framing with flanged head covering hole in sheathing.

E. Adjustable, Seismic Veneer Anchors: Provide thermally broken anchors. Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in stone masonry mortar joint, complying with the following requirements:

1. Anchor Section: Rib-stiffened, sheet metal plate with screw holes in top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section. Size wire tie to extend at least 1-1/2 inches into stone masonry but with at least a 5/8-inch cover on exterior face.
2. Connector Section: Sheet metal clip welded to wire tie with integral tabs designed to engage continuous wire.
3. Continuous Wire: 0.188-inch-diameter, stainless-steel wire.

- F. Stainless-Steel Drill Screws for Concrete: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954, except manufactured with specially designed threads for wedging into concrete and with hex washer head and neoprene washer; No. 10 by length required to penetrate concrete as recommended by manufacturer for application indicated and as required to provide proper embedment into concrete.

2.6 STONE TRIM ANCHORS

- A. Stone Trim Anchors: Units fabricated with tabs or dowels designed to engage kerfs or holes in stone trim units and holes for fasteners or postinstalled anchor bolts for fastening to substrates or framing as indicated.
- B. Materials: Fabricate anchors from stainless steel, ASTM A 240/A 240M or ASTM A 666, Type 304. Fabricate dowels from stainless steel, ASTM A 276, Type 304.
- C. Fasteners for Stone Trim Anchors: Annealed stainless-steel bolts, nuts, and washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- D. Postinstalled Anchor Bolts for Fastening Stone Trim Anchors: Chemical anchors, torque-controlled expansion anchors, or undercut anchors made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or Type 316, for anchors.

2.7 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing: For flashing unexposed to the exterior, use one of the following unless otherwise indicated:
 - 1. Stainless Steel Flashing: Composite flashing consisting of stainless-steel sheet, with butyl adhesive, and a siliconized release liner.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Illinois Products, Inc.; IPCO Self-Adhesive Stainless Steel
 - 2) STS Coatings, Inc.; Wall Guardian Self Adhering Stainless Steel Flashing
 - 3) TK Products, Inc.; TK Self-Adhering Stainless Steel TWF
 - 4) Vapro Shield, Inc.; VaproThru-Wall Flashing SA
 - 5) York Manufacturing, Inc.; York 304 SS
- B. Adhesives, Primers, and Seam Tapes for Flexible Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- C. Termination Bars for Flexible Flashing: Stainless steel with sealant catch lip.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. Weep/Vent Products: Use one of the following unless otherwise indicated:
 - 1. Mesh Weep Holes/Vents: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches high by thickness of stone masonry; in color selected from manufacturer's standard.
- C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Provide material that extends full depth and height of wall cavity.

2.9 FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated.
- B. Cut stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified in "Setting Stone Masonry" Article.
 - 1. Shape stone specified to be laid in random range ashlar pattern with sawed beds.
- C. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated. Shape beds to fit supports.
- D. Cut and drill sinkages and holes in stone for anchors and supports.
- E. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
 - 1. Clean sawed backs of stone to remove rust stains and iron particles.
- F. Thickness of Stone: Provide thicknesses indicated, and as required to produce aesthetic effects indicated, including exposed, non-aligned stone faces. Back edges of stone pieces shall align as indicated.
- G. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples and mockups.
 - 1. Finish: As indicated.

2.10 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride.

2. Use portland cement-lime mortar unless otherwise indicated.
 3. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Stone Masonry: Comply with ASTM C 270, Proportion Specification.
1. Mortar for Setting Stone: Type S, unless otherwise recommended by stone supplier.
 2. Mortar for Pointing Stone: Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Architect's sample.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary.
1. Mix to match Architect's sample.

3. EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone masonry.
- B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

3.3 SETTING STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
 - 1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
 - 2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in broken-range ashlar pattern with varying course heights, random lengths, and uniform joint widths.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place.
- F. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- G. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch at narrowest points or more than 1/2 inch at widest points.
- H. Provide sealant joints of widths and at locations indicated.
 - 1. Keep sealant joints free of mortar and other rigid materials.
 - 2. Sealant joints are specified in Section 07 92 00 "Joint Sealants."
- I. Install embedded flashing and weep holes at ledges other obstructions to downward flow of water in wall, and where indicated.
 - 1. At concrete backing, extend flashing through stone masonry, turned up a minimum of 8 inches, and fasten upper edge of flashing to concrete through termination bar.
 - 2. Install metal drip edges beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face and firmly adhere flexible flashing to top of metal drip edge.
- J. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.
 - 1. Use mesh weep holes/vents to form weep holes.
 - 2. Space weep holes not more than 24 inches o.c.
 - 3. Place cavity drainage material in cavities, where indicated, to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- B. Variation from Level: For bed joints and lines of exposed sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.
- D. Measure variation from level, plumb, and position shown in plan as a variation of the average plane of each stone face from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.

3.5 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to concrete with adjustable, screw-attached veneer anchors unless otherwise indicated. Fasten anchors in accordance with manufacturer's written instructions.
- B. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.
- C. Space anchors to provide not less than one anchor per 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.
- D. Anchor stone trim with stone trim anchors where indicated. Install anchors by fastening to substrate and inserting tabs and dowels into kerfs and holes in stone units. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with mortar.
- E. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- F. Provide 1-inch cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
 - 1. Slope beds toward cavity to minimize mortar protrusions into cavity.
 - 2. Do not attempt to trowel or remove mortar fins protruding into cavity.
- G. Rake out joints for pointing with mortar to depth of not less than 3/4 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

3.6 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch deep. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
 - 1. Joint Profile: Raked.

3.7 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective joints.
 - 3. Stone masonry not matching approved samples and mockups.
 - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
 - 3. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.

3.8 EXCESS MATERIALS AND WASTE

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

END 04 43 13.13

DIVISION 04 - MASONRY
Section 04 73 13 – Calcium Silicate Manufactured Stone Masonry

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Calcium silicate manufacturer stone masonry.
- B. Related Sections:
 - 1. Division 4 Section "Unit Masonry" for concrete masonry units and mortar for unit masonry.
 - 2. Division 5 Section "Metal Fabrications" for loose steel lintels.
 - 3. Division 7 Section "Building Insulation" for insulation in building cavity spaces.
 - 4. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
 - 5. Division 7 Section "Joint Sealants" for joint sealants at control joints.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Shop Drawings for Reinforcing: Detail fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.
- C. Samples for Verification Purposes:
 - 1. Masonry Samples: Not less than 12" in length showing full range of exposed color and texture to be expected in finish work, of required profiles.
 - 2. Colored Mortar Samples: For each color required showing the full range of color which can be expected in the finished work. Label samples to indicate type and amount of colorant used.
- D. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.
 - 1. Each different cement product required for mortar and grout including name of manufacturer, brand, type, and weight slips at time of delivery.
 - 2. Each material and grade indicated for reinforcing bars.
 - 3. Each type and size of joint reinforcement.
 - 4. Each type and size of anchors, ties, and metal accessories.
 - 5. Material test reports from a qualified independent testing laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
 - 6. Mortar complying with property requirements of ASTM C 270.
 - 7. Grout mixes. Include description of type and proportions of grout ingredients.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Masonry units.
 - 1. Cold-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.
 - 2. Hot-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

1.4 QUALITY ASSURANCE

- A. Unit Masonry Standard: Comply with ACI 530.1/ASCE 6 "Specifications for Masonry Structures".
- B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- C. Preinstallation Conference: Conduct conference at Project site to review requirements for successful installation of unit masonry.
- D. Field Constructed Mock Ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made for color and textural characteristics, under sample submittals of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials and construction; build mock-ups to comply with the following requirements:
 - 1. Locate mock-ups on site in locations as acceptable to Architect.
 - 2. Build mock-ups for the following types of masonry in sizes of approximately 6' long by 4' high by full thickness, including back-up wythes as well as accessories.
 - 3. Typical exterior face brick wall with calcium silicate manufactured stone masonry trim, base flashing and weeps.
 - 4. Clean Mock-up panel per requirements of this specification.
 - 5. Notify Architect 24 hours prior to erection of mock-up.
 - 6. Protect mock-ups from the elements with weather resistant membrane.
 - 7. Retain mock-ups during construction as standard for judging completed masonry work.
 - a. When directed, demolish mock-ups and remove from site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.
- C. Store calcium silicate manufactured stone masonry using non-absorptive spacers which allow air to circulate to eliminate pad marks.

- D. Store cementitious materials off the ground, under cover and in dry location.
- E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.6 PROJECT CONDITIONS

- A. Protection of Work: During erection, cover top of walls with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
- B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- D. Protection
 - 1. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
 - 2. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 - 3. Protect sills, ledges and projections from droppings of mortar.
 - 4. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.
- E. Cold-Weather Construction: Comply with referenced standard for cold-weather construction and the following:
 - 1. Do not lay masonry units that are wet or frozen.
 - 2. Remove masonry damaged by freezing conditions.
 - 3. When temperature is 32 deg. F. or less, heat grout materials to 90 degrees F to produce in-place grout temperature of 70 degrees F at end of work day.
 - 4. Hot-Weather Construction: Comply with referenced unit masonry standard.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 SIMULATED CALCIUM SILICATE MANUFACTURED STONE MASONRY

- A. Provide calcium silicate masonry units complying with ASTM C-73, Grade SW, and as follows:
 - 1. Compressive Strength: 8500 psi average in accordance with ASTM C 67 and not less than 6500 psi average in accordance with ASTM 170.
 - 2. Modulus of Rupture: 800 psi average in accordance with ASTM C-99.
 - 3. Absorption: 10% average in accordance with ASTM C-616.
- B. Tolerances: Flaws and imperfections are not to exceed $\pm 3/8"$ and as follows:

1. Length of Unit: $\pm 1/16"$.
 2. Height of Unit: $\pm 1/16"$.
 3. Deviation from Square: $\pm 1/16"$.
 4. Non-Critical Unit Thickness: $\pm 1/2"$.
 5. Critical Unit Thickness: $\pm 1/16"$.
- C. Colors: Match Architect's samples.
- D. Sizes: Provide heights of as indicated.
- E. Shapes and Sizes: As indicated on Drawings.
- F. Finishes: Match Architect's samples.

2.3 MORTAR

- A. Portland Cement: ASTM C-150, Type I or II, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.
- B. Hydrated Lime: ASTM C-207, Type S.
- C. Aggregates for Mortar: ASTM C-144.
- D. Water: Clean, and potable.
- E. Admixtures: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
- F. Mixing: Combine and thoroughly mix cementitious materials, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.
- G. Mortar: Comply with ASTM C-270, Proportion Specifications, of types of mortar required, unless otherwise indicated.
1. Cementitious Material: Portland cement-lime.
 2. Type for Masonry: Type N, proportioned to the following mix:
 - a. 1 part Portland cement
 - b. 1 part hydrated lime
 - c. 6 parts masonry sand

2.4 JOINT REINFORCEMENT, TIES, DOWELS, AND ANCHORING DEVICES

- A. Materials: Comply with requirements below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics.

1. Hot-Dip Galvanized Wire: ASTM A-82 for wire and ASTM A-153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for coating; apply after prefabrication into units.
 2. Hot-Dip Galvanized Steel Sheet: ASTM A-366, Class 2 or ASTM A-635; Hot-dip galvanized after fabrication to comply with ASTM A-153, Class B.
- B. Joint Reinforcement: Provide welded wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with following requirements:
1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
 2. Wire Size: 0.1483" diameter
 3. Single-Wythe Masonry: Provide truss design with single pair of side rods and with continuous diagonal cross rods spaced not more than 16" o.c.
- C. Flexible Anchors: Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.
1. Anchorage to Steel Framework: Provide manufacturer's standard anchors with crimped 1/4" diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1" of masonry face.
 2. Wire Size: 0.1875" diameter.
- D. Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A-307, Grade A, hot-dip galvanized to comply with ASTM C-153, Class C, in sizes and configurations indicated.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with ACI 530.1.
- B. Discard units with cracked faces, chipped edges or corners, or other defects that do not conform with reference standard ASTM C216.
- C. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown or specified.
- D. Cut masonry units using motor-driven saws designed to provide clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.

3.2 CONSTRUCTION TOLERANCES

- A. Comply with construction tolerances of referenced unit masonry standard.

3.3 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Pattern Bond:
 - 1. Exposed Masonry: Unless shown otherwise, lay in running bond vertical joint in each course centered on units in courses above and below.
 - 2. Corners: Bond and interlock each course of each wythe. Do not use units with less than 4" horizontal face dimensions at corners or jambs. For 6" nominal thickness walls, use special shape units to maintain running bond pattern.

3.4 MORTAR BEDDING AND JOINTING

- A. Simulated Calcium silicate manufactured stone masonry: Set units in full bed of mortar with all vertical joints slushed full. Fill dowel, anchor and similar holes solid.
- B. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" joints.
- C. Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.
- D. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to expose sound mortar.
 - 1. Prepare stone joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply first layer of pointing mortar in layers not greater than 3/8" until a uniform depth is formed; compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
 - 2. Point stone joints by placing pointing mortar in 3 layers with each of first and second layers filling approximately two-fifths of joint depth and third layer remaining one-fifth. Fully compact each layer and allow to become thumbprint hard before applying next layer.
 - 3. Tool joints with a round joiner having a diameter 1/8" larger than width of joint, when pointing mortar is thumbprint hard.
- E. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.5 CAVITIES/AIR SPACES

- A. Keep cavity clean of mortar droppings and other materials during construction. Parge joints facing cavity flat.

- B. Anchorage to Back-Up: Tie exterior wythe to back-up with continuous horizontal joint reinforcing embedded in mortar joints at not more than 16" o.c. vertically.
- C. Weepholes: Provide in exterior wythe of cavity located immediately above ledges and flashing, spaced 2'-0" o.c., unless otherwise indicated.
- D. In cavities/air spaces place mortar net immediately above weepholes and flashing embedded in the wall, to maintain drainage.

3.6 HORIZONTAL JOINT REINFORCEMENT

- A. General: Provide continuous horizontal joint reinforcing as indicated and spaced not more than 16" vertically. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6".
 - 1. Cut or interrupt joint reinforcement at control and expansion joints with reinforcing, unless otherwise indicated.
- B. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:
 - 1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
 - 2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24" o.c. vertically and 36" o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Provide horizontal and vertical expansion, control and isolation joints in masonry where shown. Build-in related masonry accessory items as the masonry work progresses.
- B. Compressible Fillers: Build-in compressible fillers where indicated.
 - 1. Build in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting compressible joint filler of width required to permit installation of sealant and backer rod.
- C. If not indicated, provide control joints in concrete masonry not exceeding 25 feet and in accordance with referenced standards.

3.9 LINTELS

- A. Steel Lintels: Install where indicated.

3.10 FLASHING AND WEEPHOLES

- A. General: Provide concealed flashings in masonry work at, or above, all shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior.
- B. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and turn down to form drip.
- C. Install flashings as follows:
 - 1. At lintels, extend flashing a minimum of 4 inches into masonry at each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches, and through the inner wythe to within 1/2 inches of the interior face of the wall.
 - 2. At heads and sills, extend flashing as specified above unless otherwise indicated but turn up ends not less than 2 inches to form a pan.
 - 3. Interlock end joints of flashings by overlapping not less than 1-1/2 inches and seal lap with elastomeric sealant complying with requirements of Division 7 Section, "Joint Sealants" for application indicated.
 - 4. Turn down sheet metal flashings at exterior face of masonry to form drip.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashings and as follows:
 - 1. Space weep holes 24 inches o.c.
- E. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.11 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of sealants.
- C. Do not allow excess mortar to harden on the ground face block finished surfaces. Remove green mortar with burlap or dry cloth.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:

1. Testing Cleaning Methods: Test on sample wall panels; leave 1/2 panel uncleaned for comparison purposes.
 - a. Pre-Cleaning Conference: Obtain Architect's acceptance of sample cleaning before proceeding. Review cleaning agents proposed for use and whether special methods will be required for removing localized stains, and, if so, what agents will be used.
 2. Preliminary Cleaning: Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 3. Use of Cleaning Agents:
 - a. Provide proprietary cleaning agent designed for new masonry surfaces of types indicated; expressly approved for intended use by manufacturers of masonry units being cleaned; complying with environmental regulations; and that will not harm materials with which it will come in contact. If requested by Architect, submit data substantiating compliance with above requirements.
 - b. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.
 - c. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
- E. Protection: Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of Substantial Completion.

END 04 73 13

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Miscellaneous steel framing and supports.
 - 2. Metal ladders.
 - 3. Miscellaneous steel trim.
 - 4. Metal bollards.
 - 5. Loose bearing and leveling plates.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Fasteners.
 - 2. Shop primers.
 - 3. Shrinkage-resisting grout.
 - 4. Slotted channel framing.
 - 5. Manufactured metal ladders.
 - 6. Metal bollards.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Delegated-Design Submittal: For metal fabrications, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

2. PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal fabrications.
- B. Structural Performance:
 - 1. Countertop Framing: Provide countertop framing capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials

involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:

- a. All dead loads.
 - b. 500 pound live load placed on the countertop and vanity.
 - c. Deflection at Midspan: $L/1000$ times span or 1/8-inch whichever is less.
2. Tube Framing for Partial Height Walls: Provide tube framing for partial height walls capable of withstanding a deflection not to exceed $2L/1440$ of the wall height when subjected to a positive and negative pressure of 5 psf METALS
- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
1. Size of Channels: As indicated.
 2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 coating; 0.079-inch nominal thickness.
- F. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
1. Provide stainless steel fasteners for fastening stainless steel.
- B. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

- D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 8 inches from ends and corners of units and 24 inches o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.7 METAL LADDERS

- A. General:
 - 1. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Steel Ladders:
 - 1. Space siderails 16 inches apart unless otherwise indicated.
 - 2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
 - 3. Rungs: 3/4-inch-diameter, steel bars.
 - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung.
 - 6. Galvanize ladders, including brackets.

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.

2.9 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.

1. Cap bollards with 1/4-inch-thick steel.
- B. Prime steel bollards with primer specified in Section 09 91 13 "Exterior Painting."

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Galvanize and prime loose steel lintels located in exterior walls.

2.11 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.12 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.

2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 1. Shop prime with primers specified in Section 09 91 13 "Exterior Painting" and primers specified in Section 09 91 23 "Interior Painting."
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.

3.3 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
- B. Anchor bollards in concrete in formed or core-drilled holes not less than 42 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

- C. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

3.4 REPAIRS

- A. Touchup Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END 05 50 00.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Preassembled steel stairs with concrete-filled treads.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

1.3 ACTION SUBMITTALS

- A. Product Data: For metal pan stairs.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
 - 3. Include plan at each level.
 - 4. Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.
- C. Delegated-Design Submittal: For stairs, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the State in which Project is located.
- C. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design stairs, including attachment to building construction.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform Load: 100 lbf/sq. ft..
 - 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 - 5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

2.3 METALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Tubing for Railings: ASTM A500/A500M (cold formed) or ASTM A513/A513M.
- C. Uncoated, Cold-Rolled Steel Sheet: ASTM A1008/A1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.
- D. Uncoated, Hot-Rolled Steel Sheet: ASTM A1011/A1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.

2.4 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls.
 - 1. Select fasteners for type, grade, and class required.
- B. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for interior use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 1. Join components by welding unless otherwise indicated.
 2. Use connections that maintain structural value of joined pieces.
- B. Assemble stairs in shop to greatest extent possible.
 1. Disassemble units only as necessary for shipping and handling limitations.
 2. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately.
 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 2. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Weld exposed corners and seams continuously unless otherwise indicated.
 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 - No evidence of welded joint.

- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 - 1. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
 - 2. Locate joints where least conspicuous.
 - 3. Fabricate joints that will be exposed to weather in a manner to exclude water.
 - 4. Provide weep holes where water may accumulate internally.

2.7 FABRICATION OF STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Commercial Class, unless more stringent requirements are indicated.
- B. Stair Framing:
 - 1. Fabricate stringers steel channels or steel rectangular tubes.
 - a. Stringer Size: As required to comply with "Performance Requirements" Article.
 - b. Provide closures for exposed ends of channel and rectangular tube stringers.
 - c. Finish: Shop primed.
 - 2. Construct platforms of steel channel or rectangular tube headers and miscellaneous framing members as required to comply with "Performance Requirements" Article.
 - a. Provide closures for exposed ends of channel and rectangular tube framing.
 - b. Finish: Shop primed.
 - 3. Weld stringers to headers; weld framing members to stringers and headers.
 - 4. Where stairs are enclosed by gypsum board shaft-wall assemblies, provide hanger rods or struts to support landings from floor construction above or below.
 - a. Locate hanger rods and struts where they do not encroach on required stair width and are within the fire-resistance-rated stair enclosure.
 - 5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- C. Metal Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements, but not less than 0.067 inch.
 - 1. Steel Sheet: Uncoated, cold or hot-rolled steel sheet.
 - 2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
 - 3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 - 4. Shape metal pans to include nosing integral with riser.
 - 5. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

- a. Smooth Soffit Construction: Construct subplatforms with flat metal under surfaces to produce smooth soffits.

2.8 FABRICATION OF STAIR RAILINGS

- A. Comply with applicable requirements in Section 05 52 13 "Pipe and Tube Railings."

2.9 FINISHES

- A. Finish metal stairs after assembly.
- B. Preparation for Shop Priming: Prepare uncoated, ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

3. EXECUTION

3.1 INSTALLING METAL PAN STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.
 - 1. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
 - 2. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 - 3. Comply with requirements for welding in "Fabrication, General" Article.
- F. Place and finish concrete fill for treads and platforms to comply with Section 03 30 00 "Cast-in-Place Concrete."

3.2 REPAIR

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

END 05 51 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Steel pipe and tube railings.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

- C. Samples: For each type of exposed finish required.

- D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E894 and ASTM E935.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.

- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

- a. Uniform load of 50 lbf/ ft. applied in any direction.
- b. Concentrated load of 200 lbf applied in any direction.
- c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

- a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
- b. Infill load and other loads need not be assumed to act concurrently.

2.3 METALS, GENERAL

- A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.4 STEEL AND IRON

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

2.5 FASTENERS

- A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329 for zinc coating.

- B. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.7 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. Form changes in direction by bending or by inserting prefabricated elbow fittings.

- F. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- G. Close exposed ends of railing members with prefabricated end fittings.
- H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

2.8 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize exterior steel railings, including hardware, after fabrication.
 - 2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
 - 3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
- B. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Do not apply primer to galvanized surfaces.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

3.2 ANCHORING POSTS

- A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.

3.3 ATTACHING RAILINGS

- A. Attach railings to wall with wall brackets. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.
 - 3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
 - 4. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.
 - 5. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

END 05 52 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Metal bar gratings and metal frames and supports for gratings.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Clips and anchorage devices for gratings.
 - 2. Paint products.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Delegated-Design Submittal: For gratings, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alabama Metal Industries Company; a Gibraltar Industries company.
 - 2. Fisher & Ludlow; a NUCOR Company.
 - 3. Harsco Industrial IKG, a division of Harsco Corporation.
 - 4. Ohio Gratings, Inc.
 - 5. Seidelhuber Metal Products; Brodhead Steel.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design gratings.
- B. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Floors: Uniform load of 125 lbf/sq. ft. or concentrated load of 2000 lbf, whichever produces the greater stress.
 - 2. Floors: Uniform load of 250 lbf/sq. ft. or concentrated load of 3000 lbf, whichever produces the greater stress.
 - 3. Walkways and Elevated Platforms Other Than Exits: Uniform load of 60 lbf/sq. ft..
 - 4. Limit deflection to L/360 or 1/4 inch, whichever is less.
- C. Seismic Performance: Gratings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Component Importance Factor: 1.5.

2.4 METAL BAR GRATINGS

- A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
- B. Welded Steel Grating:
 - 1. Bearing Bar Spacing: 7/16 or 1/2 inch o.c.
 - 2. Bearing Bar Depth: As required to comply with structural performance requirements.
 - 3. Bearing Bar Thickness: As required to comply with structural performance requirements.
 - 4. Crossbar Spacing: 4 inches o.c.
 - 5. Traffic Surface: Plain.
 - 6. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.

2.5 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Bars for Bar Gratings: ASTM A36/A36M or steel strip, ASTM A1011/A1011M or ASTM A1018/A1018M.
- C. Wire Rod for Bar Grating Crossbars: ASTM A510.
- D. Uncoated Steel Sheet: ASTM A1011/A1011M, structural steel, Grade 30.
- E. Galvanized-Steel Sheet: ASTM A653/A653M, structural quality, Grade 33, with G90 coating.

2.6 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Post-Installed Anchors: Torque-controlled expansion or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.

2.7 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.8 FABRICATION

- A. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Fit exposed connections accurately together to form hairline joints.

2.9 GRATING FRAMES AND SUPPORTS

- A. Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
 - 1. Unless otherwise indicated, fabricate from same basic metal as gratings.
 - 2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- B. Galvanize steel frames and supports in the following locations:
 - 1. Exterior.
 - 2. Interior, where indicated.

2.10 STEEL FINISHES

- A. Finish gratings, frames, and supports after assembly.

- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
- C. Shop prime gratings, frames, and supports unless otherwise indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- B. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach nonremovable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END 05 53 13.

PART 1 - GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Aluminum decorative railings.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Manufacturer's product lines of decorative metal railings assembled from standard components.
2. Handrail brackets.
3. Bituminous paint.
4. Nonshrink, nonmetallic grout.
5. Metal finishes.

B. Shop Drawings: Include plans, elevations, sections, and attachment details.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

A. Qualification Data: For Illinois licensed Structural Engineer.

B. Welding certificates.

C. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894 and ASTM E935.

1.4 QUALITY ASSURANCE

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

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

PART 2 - PRODUCTS

1.2 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.3 ALUMINUM DECORATIVE RAILINGS

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- B. Extruded Bars and Shapes: ASTM B221, Alloy 6063-T5/T52.
- C. Extruded Structural Round Tubing: ASTM B429/B429M, Alloy 6063-T6.
 - 1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.

- D. Drawn Seamless Tubing: ASTM B210/B210M, Alloy 6063-T832.
- E. Plate and Sheet: ASTM B209, Alloy 5005-H32 or Alloy 6061-T6.
- F. Die and Hand Forgings: ASTM B247, Alloy 6061-T6.
- G. Castings: ASTM B26/B26M, Alloy A356.0-T6.

2.4 FASTENERS

- A. Fastener Materials:
 - 1. Aluminum Railing Components: Type 304 stainless steel fasteners.
- B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593 and nuts, ASTM F594.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
 - 1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION

- A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Connections: Fabricate railings with welded or mechanical connections unless otherwise indicated.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint.
- D. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- E. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings.
- F. Form changes in direction as follows:
 1. By bending or by inserting prefabricated elbow fittings.
- G. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- H. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- I. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.
- J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other Work unless otherwise indicated.

2.7 ALUMINUM FINISHES

- A. Powder-Coat Finish: AAMA 2605 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 ANCHORING POSTS

- A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

3.3 ATTACHING RAILINGS

- A. Attach handrails to walls with wall brackets, except where end flanges are used. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
- B. Secure wall brackets and railing end flanges to building construction as follows:
1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 2. For hollow masonry anchorage, use toggle bolts.
 3. For steel-framed partitions, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.
 4. For steel-framed partitions, fasten brackets with toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 CLEANING

- A. Clean aluminum by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

END 05 73 00

DIVISION 05 - METALS
Section 05 73 13 - Glazed Decorative Metal Railings

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Post-supported railings with glass infill.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Manufacturer's product lines of railings assembled from standard components.
2. Grout, anchoring cement, and paint products.

- B. Shop Drawings: Include plans, elevations, sections, and attachment details.

- C. Samples: For each type of exposed finish required.

- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Qualification Data: For professional engineer.

- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E894 and ASTM E935.

- D. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.4 QUALITY ASSURANCE

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

1. Build mockups for each form and finish of railing as follows:

- a. Post-Supported Railings: Include two posts, top rail, infill area, and anchorage system components.

1.5 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Glazed decorative metal railing manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

- 1. Warranty Period: Five years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. C.R. Laurence Co., Inc.
 - 2. Greco Aluminum Railings Ltd.
 - 3. Kane Innovations.
 - 4. VIVA Railings, LLC.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.

- c. Uniform and concentrated loads need not be assumed to act concurrently.
- 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Wind Loads: For exterior glazed decorative metal railings, capable of withstanding the following wind loads in accordance with the IBC and ASTM E1300:
 - 1. Wind Load: As indicated on Drawings.
- 2.4 METALS, GENERAL
 - A. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
- 2.5 ALUMINUM
 - A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
 - B. Extruded Bars and Shapes, Including Extruded Tubing: ASTM B221, Alloy 6063-T5/T52.
 - C. Extruded Structural Round Tubing: ASTM B429/B429M, Alloy 6063-T6.
 - D. Drawn Seamless Tubing: ASTM B210, Alloy 6063-T832.
 - E. Plate and Sheet: ASTM B209, Alloy 5005-H32 or Alloy 6061-T6.
 - F. Castings: ASTM B26/B26M, Alloy A356.0-T6.
- 2.6 GLASS AND GLAZING MATERIALS
 - A. Safety Glazing: Glazing shall comply with 16 CFR 1201, Category II.
 - B. Laminated Glass: ASTM C1172, Condition A (uncoated), Type I (transparent flat glass), Quality-Q3 with two plies of glass and interlayer not less than 0.060 inch thick.
 - 1. Kind: LT (laminated tempered).
 - 2. Glass Color: Clear.
 - 3. Interlayer: Ionoplast polymer interlayer.
 - a. Color: Clear.
 - 4. Glass Plies for Glass Infill Panels: Thickness required by structural loads, but not less than 5.0 mm each.

- C. Safety Glazing Labeling: Permanently mark glass with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- D. Glazing Gaskets for Glass Infill Panels: Glazing gaskets and related accessories recommended or supplied by railing manufacturer for installing glass infill panels in post-supported railings.

2.7 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Aluminum Components: Type 304 stainless steel fasteners.
- B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.

2.8 MISCELLANEOUS MATERIALS

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.9 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage.
- B. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- C. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.

2.10 GLAZING PANEL FABRICATION

- A. Infill Panels: Provide laminated, tempered glass panels.

2.11 ALUMINUM FINISHES

- A. Powder-Coat Finish: AAMA 2605 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

3. EXECUTION

3.1 INSTALLATION

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.
- E. Post-Supported Glass Railings: Install assembly to comply with railing manufacturer's written instructions and with requirements in other Part 3 articles. Erect posts and other metal railing components, then set factory-cut glass panels. Do not cut, drill, or alter glass panels in field. Protect edges from damage.

END 05 57 13.

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Section 06 10 53 - Miscellaneous Rough Carpentry

PART 1 - GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Rooftop equipment bases and support curbs.
2. Wood blocking, cants, and nailers.
3. Plywood backing panels.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.

PART 2 - PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- B. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWP 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 does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.

2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 2. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Concealed blocking.
 - 2. Plywood backing panels.

2.5 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.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
- C. Concealed Boards: 15 percent maximum moisture content of 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 WWP.

2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Screws for Fastening to Metal Framing: ASTM C1002, length as recommended by screw manufacturer for material being fastened.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.8 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. ICC-ES evaluation report for fastener.

END 06 10 53

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Section 06 16 00 - Sheathing

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Wall sheathing.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.

1. Products: Subject to compliance with requirements, provide one of the following:
- a. CertainTeed Corporation; GlasRoc.
 - b. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
 - c. United States Gypsum Company; Securock.
2. Type and Thickness: Type X, 5/8 inch thick.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated on Sheet S0-01 that comply with requirements specified in this article for material and manufacture.
1. For roof, parapet, and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Cut and space edges of panels to match spacing of structural support elements.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Seal sheathing joints according to sheathing manufacturer's written instructions.
 - 1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END 06 16 00

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Section 06 20 23 - Interior Finish Carpentry

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Interior trim.

1.2 DEFINITIONS

- A. MDF: Medium-density fiberboard.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's 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, mark grade stamp on end or back of each piece.
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: ANSI A135.4.
- D. MDF: ANSI A208.2, Grade 130.

- E. Particleboard: ANSI A208.1, Grade M-2.

2.3 INTERIOR TRIM

- A. Lumber Trim for Opaque Finish (Painted Finish):

1. Wood Species: Any closed-grain hardwood.
2. Maximum Moisture Content: 10 percent.
3. Face Surface: Surfaced (smooth).

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Multipurpose Construction Adhesive: Formulation, complying with ASTM D 3498, that is recommended for indicated use by adhesive manufacturer.

3. EXECUTION

3.1 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.2 INSTALLATION, GENERAL

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 1. Use concealed shims where necessary for alignment.
 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.3 STANDING AND RUNNING TRIM INSTALLATION

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 - 1. Do not use pieces less than 24 inches long, except where necessary.
 - 2. Stagger joints in adjacent and related standing and running trim.
 - 3. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 - 4. Use scarf joints for end-to-end joints.
 - 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 - 6. Install trim after gypsum-board joint finishing operations are completed.
 - 7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
 - 8. Fasten to prevent movement or warping.
 - 9. Countersink fastener heads on exposed carpentry work and fill holes.

END 06 20 23.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Plastic sheet paneling.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Composites, Inc.
 - b. Glasteel.
 - c. Marlite.
 - d. Nudo Products, Inc.
 - e. Parkland Plastics, Inc.
2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

3. Nominal Thickness: Not less than 0.09 inch.
4. Surface Finish: Molded pebble texture.
5. Color: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
 1. Color: Match panels.
- B. Sealant: Mildew-resistant, single-component, neutral-curing or acid-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "Joint Sealants."

3. EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints so that trimmed panels at corners are not less than 12 inches wide.

3.2 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END 06 64 00.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 13 26 - Self-Adhering Sheet Waterproofing

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Modified bituminous sheet waterproofing.
2. Blindside sheet waterproofing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.3 ACTION SUBMITTALS

A. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

B. Samples: For each exposed product and for each color and texture specified, including the following products:

1. 8-by-8-inch square of waterproofing and flashing sheet.
2. 4-by-4-inch square of drainage panel.

1.4 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

B. Qualification Data: For Installer.

C. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.
 - 1. Warranty includes removing and reinstalling drainage panels.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials and molded= sheet drainage panels from single source from single manufacturer.

2.3 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. GCP Applied Technologies Inc.
 - c. W.R. Meadows, Inc.

2. Physical Properties:

- a. Tensile Strength, Membrane: 250 psi minimum; ASTM D 412, Die C, modified.
- b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
- c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970/D 1970M.
- d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836/C 836M.
- e. Puncture Resistance: 40 lbf minimum; ASTM E 154/E 154M.
- f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
- g. Water Vapor Permeance: 0.05 perm maximum; ASTM E 96/E 96M, Water Method.

3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.4 BLINDSIDE SHEET WATERPROOFING

A. Blindside Sheet Waterproofing for Vertical Applications (Shoring Walls): Uniform, flexible, multilayered-composite sheet membrane that forms a permanent bond with fresh concrete placed against it; complete with accessories and preformed shapes for an unbroken waterproofing assembly; with the following physical properties:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Carlisle Coatings & Waterproofing Inc.
- b. GCP Applied Technologies Inc.
- c. W.R. Meadows, Inc.

2. Physical Properties:

- a. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970/D 1970M.
- b. Peel Adhesion to Concrete: 5 lbf/in. minimum; ASTM D 903, modified.
- c. Lap Adhesion: 5 lbf/in. minimum; ASTM D 1876, modified.
- d. Hydrostatic-Head Resistance: 230 feet; ASTM D 5385, modified.
- e. Puncture Resistance: 100 lbf minimum; ASTM E 154/E 154M.
- f. Water Vapor Permeance: 0.1 perm maximum; ASTM E 96/E 96M, Water Method.
- g. Ultimate Elongation: 335 percent minimum; ASTM D 412, modified.

B. Blindside Sheet Waterproofing for Horizontal Applications (Underslab): Uniform, flexible, multilayered-composite sheet membrane that forms a permanent bond with fresh concrete placed against it; complete with accessories and preformed shapes for an unbroken waterproofing assembly; with the following physical properties:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Carlisle Coatings & Waterproofing Inc.
- b. GCP Applied Technologies Inc.
- c. W.R. Meadows, Inc.

2. Physical Properties:

- a. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970/D 1970M.
- b. Peel Adhesion to Concrete: 5 lbf/in. minimum; ASTM D 903, modified.
- c. Lap Adhesion: 5 lbf/in. minimum; ASTM D 1876, modified.
- d. Hydrostatic-Head Resistance: 230 feet; ASTM D 5385, modified.
- e. Puncture Resistance: 200 lbf minimum; ASTM E 154/E 154M.
- f. Water Vapor Permeance: 0.1 perm maximum; ASTM E 96/E 96M, Water Method.
- g. Ultimate Elongation: 335 percent minimum; ASTM D 412, modified.

- C. Mastic, Adhesives, and Detail Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

2.5 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
- F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

2.6 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel without Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core, without a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft..
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. GCP Applied Technologies Inc.
 - c. W.R. Meadows, Inc.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.
 - 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 - 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
- F. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.
 - 1. Invert and loosely lay first sheet strip over center of joint where recommended by manufacturer. Firmly adhere second sheet strip to first and overlap to substrate.
- G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
 - 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

- a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.
 - b. At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
 - 1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- E. Seal edges of sheet-waterproofing terminations with mastic.
- F. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

3.4 BLINDSIDE SHEET-WATERPROOFING APPLICATION

- A. Install blindside sheet waterproofing according to manufacturer's written instructions.
- B. Vertical Applications: Install sheet with face against substrate. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by membrane manufacturer. Overlap and seal seams, and stagger and tape end laps to ensure watertight installation. Mechanically fasten to substrate.
 - 1. Securely fasten top termination of membrane with continuous metal termination bar anchored into substrate and cover with detail tape.
- C. Horizontal Applications: Install sheet with face against substrate. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by membrane manufacturer. Overlap and seal seams, and stagger and tape end laps to ensure watertight installation.

- D. Corners: Seal lapped terminations and cut edges of sheet waterproofing at inside and outside corners with detail tape.
- E. Seal penetrations through sheet waterproofing to provide watertight seal with detail tape patches or wraps and a liquid-membrane troweling.
- F. Install sheet-waterproofing and auxiliary materials to produce a continuous watertight tie into adjacent waterproofing.
- G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Tape perimeter of damaged or nonconforming area extending 6 inches beyond repaired areas in all directions. Apply a patch of sheet waterproofing and firmly secure with detail tape.

3.5 INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. For vertical applications, install board insulation before installing drainage panels.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.
- B. Waterproofing will be considered defective if it does not pass tests and inspections.

3.7 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END 07 13 26.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 21 00 - Thermal Insulation

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Extruded polystyrene foam-plastic board.
2. Mineral-wool board.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Product test reports.
- C. Research reports.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Extruded polystyrene boards in this article are also called "XPS boards."
- B. Extruded Polystyrene Board, Type X (Foundation Wall Insulation): ASTM C578, Type X, 15-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E84.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.

2.3 MINERAL-WOOL BOARD

- A. Preformed Mineral-Wool Board, Types IA and IB, Unfaced: ASTM C612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics. Nominal density of 6 lb/cu. ft.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Rockwool International.
 - d. Thermafiber, Inc.; an Owens Corning company.

2.4 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.
- C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 36 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 1. If not otherwise indicated, extend insulation a minimum of 36 inches in from exterior walls.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 04 20 00 "Unit Masonry."

END 07 21 00.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 27 26 - Fluid-Applied Membrane Air Barriers

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Vapor-retarding, fluid-applied air barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For air-barrier assemblies.

1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Product certificates.

- C. Product test reports.

- D. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

- B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly, 150 sq. ft., incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

- a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.

- b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E2357.

2.3 HIGH-BUILD AIR BARRIERS, VAPOR RETARDING

- A. High-Build, Vapor-Retarding Air Barrier: Modified bituminous or synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils or thicker over smooth, void-free substrates.

1. Modified Bituminous Type:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Carlisle Coatings & Waterproofing Inc.
- 2) Henry Company.
- 3) Tremco Incorporated.
- 4) W.R. Meadows, Inc.

2. Synthetic Polymer Type:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Carlisle Coatings & Waterproofing Inc.
- 2) GCP Applied Technologies Inc.
- 3) Henry Company.
- 4) W.R. Meadows, Inc.

3. Physical and Performance Properties:

- a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
- b. Vapor Permeance: Maximum 0.1 perm; ASTM E96/E96M, Desiccant Method.
- c. Ultimate Elongation: Minimum 500 percent; ASTM D412, Die C.
- d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D4541.
- e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- f. UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

3. EXECUTION

3.1 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- D. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- F. Bridge isolation joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.2 INSTALLATION

- A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
- D. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.
- E. High-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
1. Vapor-Retarding, High-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 35 mils, applied in one or more equal coats.
 2. **(0.9 mm)** Do not cover air barrier until it has been tested and inspected by testing agency.
- G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests: As determined by testing agency. from among the following tests:
1. Air-barrier dry film thickness.
 2. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, chamber pressurization or depressurization with smoke tracers or ASTM E1186, chamber depressurization using detection liquids.
 3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.
- C. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 2. Remove and replace deficient air-barrier components for retesting as specified above.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- E. Prepare test and inspection reports.

3.4 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Remove masking materials after installation.

END 07 27 26.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 42 13.13 - Formed Metal Wall Panels

PART 1 - GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Exposed-fastener, lap-seam metal wall panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication 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.
- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Product test reports.
- B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 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. Warranty Period: Two years from date of Substantial Completion.
- 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. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

1.2 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. 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.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
- B. Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs and a flat pan between major ribs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Berridge Manufacturing Company.
 - b. CENTRIA Architectural Systems.
 - c. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
- 2. Metallic-Coated Steel Sheet: 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: 0.034 inch.
 - b. Exterior Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.

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. 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.
- D. 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.

2.4 FABRICATION

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

2.5 FINISHES

- A. Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
 - 2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION

- A. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 - 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 - 5. Flash and seal panels with weather closures at perimeter of all openings.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. 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 as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

- 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.

END 07 42 13.13.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 42 13.23 - Metal Composite Material Wall Panels

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Metal composite material wall panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal composite material panel Installer, metal composite material panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal composite material panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal composite material panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

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 and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.

- C. Samples for Initial Selection: For each type of metal composite material 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 required, prepared on Samples of size indicated below.
 - 1. Metal Composite Material Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer.
- C. Product Test Reports: For each product, tests performed by a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical metal composite material panel assembly, including corner, soffits, supports, attachments, and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. 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 composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.

- B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal composite material panels during installation.

1.8 FIELD CONDITIONS

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

1.9 COORDINATION

- A. Coordinate metal composite material 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 composite material 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 years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material 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 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: 20 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E330:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. 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.
- C. Fire Propagation Characteristics: Metal composite material wall panel system passes NFPA 285 testing.

2.3 METAL COMPOSITE MATERIAL WALL PANELS

- A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Alcoa Architectural Products (USA); Reynobond FR.
 - b. ALPOLIC Materials; Mitsubishi Chemical Composites; ALPOLIC/fr.
 - c. ALUCOBOND; 3A Composites USA, Inc; Alucobond Plus.
- B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch-thick, coil-coated aluminum sheet facings.
 - 1. Panel Thickness: 0.157 inch.
 - 2. Core: Fire retardant.
 - 3. Exterior Finish: Two-coat fluoropolymer.
 - a. Color: Match Architect's samples.
- C. Attachment Assembly Components: Formed from extruded aluminum.

- D. Attachment Assembly: Manufacturer's standard.

2.4 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 composite material 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 composite material panels unless otherwise indicated.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

2.5 FABRICATION

- A. General: Fabricate and finish metal composite material 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. Fabricate metal composite material 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.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations 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. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. 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.

2.6 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. Aluminum Panels and Accessories:
 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.
 1. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material 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 assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material 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 according to ASTM C754 and metal composite material panel manufacturer's written recommendations.

3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

- A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material 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 composite material panels.
 - 2. Flash and seal metal composite material 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 composite material 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 composite material 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 composite material 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. 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 composite material panel manufacturer.
- D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
 - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Dry Seal Systems: Seal horizontal and vertical joints between adjacent metal composite material wall panels with manufacturer's standard gasket system.
 2. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.
- F. 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 composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.
- G. 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 as indicated. 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 result in waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped 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).

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing agency to perform field tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal composite material wall panel installation, including accessories.
- D. Metal composite material 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 composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.
- B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END 07 42 13.23.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 42 29 - Terracotta Rainscreen System

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Extruded hollow terracotta tiles and panels.
2. Aluminum clip and sub-grits system.
3. Flashing, weather-seals, cover plates and formed metal trim.
4. Miscellaneous anchors, fasteners, adhesives, insulation, vapor barrier, sealants, and related accessories.

1.2 SYSTEM DESCRIPTION

- A. General: Complete, pre-engineered aluminum clip and sub-girt system, with aluminum stud framing, insulation (where indicated), closure pieces, trim and flashing. The system is to be composed of double-leaf clay (terra-cotta) tiles, which can only be removed on purpose, tiles hung on aluminum clips, at head grooves and base channels, fastened to horizontal aluminum subframing, which is attached to building structural framing.
- B. Design system to allow for all movements within structure, and to support loads transferred from the adjacent construction and to fit within the space allotted without projections into the finished space as shown on the Drawings.
- C. Design Criteria:
1. Strength: Design system to withstand loadings as specified.
 2. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within panel system
 3. Flatness: System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities.
 4. The drawings indicate sizes, profiles, finishes, and dimensional requirements of the exterior wall system required and are based on specific types and models specified. With no less than 10 days prior to the bid, exterior wall system components by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as solely judged by the Architect. The burden of proof of equality is on the proposer.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings:

1. Include fabrication and installation layouts of terracotta tiles; details of edge conditions, joints, panel profiles, corners, base of wall and head of wall conditions, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
 2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 3 inches per 12 inches.
- C. Samples for Verification: Submit two sample sets of Samples for each color, surface finish, and panel surface texture required. Each sample set shall include tiles illustrating full range of aesthetic characteristics (e.g. color and surface texture) that can be expected in the finished Work. Include the following:
1. Terracotta Tiles: 12 inches in length by full height of tile.
 2. Accessory Tiles: Full size, each type.
 3. Support Subframing: 12 inches in length.
 4. Accessory Items: Full size, each type.
 5. Flashings: 12 inches in length.
- D. Delegated-Design Submittal: For terracotta wall assemblies, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer.
- C. Field quality-control reports.

1.1 CLOSEOUT SUBMITTALS

- D. Maintenance Data: For terracotta tiles to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a firm that specializes in the installation of terracotta cladding assemblies; that employs installers and supervisors who are trained and approved by manufacturer; that has successfully completed installations similar in material, design, and extent to that required for Project, on not less than five projects of similar scope, to the satisfaction of Architect; and whose work has resulted in construction with a record of successful in-service performance for a period of 5 years.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 1. Build mockup of typical terracotta cladding assembly as shown on Drawings, including corners, supports, attachments, and accessories.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. 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, terracotta tiles, and other manufactured items in manufacturer's original packaging to prevent damage, with original labels describing contents intact. Package terracotta tiles for protection during transportation and handling.
- B. Store terracotta tiles according to manufacturer's written instructions. Store inside, in dry location, covered and protected from weather, moisture, soiling, and damage due to construction activities.
- C. Handle terracotta tiles according to manufacturer's written instructions. Use gloves as required to prevent staining of tile surfaces.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of terracotta cladding assemblies that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including warping, rupturing, or cracking.
 - b. Deterioration of terracotta tiles and other components beyond normal weathering.
 2. Warranty Period: Ten years from date of Substantial Completion.
- B. Installer's Warranty: Signed by Installer, agreeing to repair or replace components or assemblies fail in workmanship, including failure to remain weathertight, during the warranty period.
 1. Warranty shall not be prorated and shall include labor and materials for removal and replacement of cladding assembly and components.
 2. Warranty Period: Two years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations: Obtain components of terracotta tile cladding assemblies from single source from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design terracotta cladding assemblies, including subframing and attachments to building structure.
- B. Structural Performance: Provide terracotta cladding assemblies capable of withstanding the effects of graving and the following loads:
 - 1. Wind Loads: The terracotta cladding assemblies shall be designed, fabricated, and installed to withstand the maximum inward and outward wind pressures as determined according to ASCE/SEI 7-10.
 - 2. Other Design Loads: As indicated on Drawings.
- C. Air and Water Resistance: Cladding assembly shall have been tested by certified testing agency for resistance to air and water infiltration according to AAMA 508, "Methods of Test for Pressure Equalized Rainscreen Wall Cladding Systems."
- D. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.4 MATERIALS

- A. Terracotta Tile: Hollow terracotta tile units complying with the following:
 - 1. Tile Sizes: As indicated on Drawings.
 - 2. Surface Finish: Standard, unless otherwise indicated.
 - 3. Colors: As selected by Architect from manufacturer's full range.
 - 4. Sealer: Manufacturer's recommended penetrating sealer to prevent retention of, and staining due to, dirt and atmospheric pollution.

2.5 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM B 209, Alloy 6061-T6, aluminum plate and sheet; ASTM B 221, Alloy 6063-T6, aluminum extrusions; and ASTM B 26, Alloy 443.0-F, aluminum castings. Provide manufacturer's standard sections as required for support and alignment of terracotta tiles and cladding assembly, and as required to withstand design loads indicated.
- B. Fasteners, Clips, and Anchor Channels:
 - 1. General: Provide as recommended by manufacturer to meet load requirements specified.
 - a. Clips shall be concealed.
 - b. Clips shall support the tiles at the thickest and strongest part of the tiles and not only at the upper lip of the tile.
 - 2. Vertical spacers:

- a. Provide as recommended by manufacturer to maintain a weathertight installation.
 - b. No sealants, gaskets or other materials which can deteriorate over time or may be flammable may be incorporated in to the system.
 - c. The spacer will be painted with a polyester paint to mach tiles color.
- 3. Accessories:
 - a. Corrosion resistant type capable of supporting cladding system and specified design loads; design to allow adjustments of system prior to being permanently fastened in place.
- C. Bituminous Paint:
 - 1. Cold-applied mastic, SSPC Paint 12, compounded for 30 mil thickness per coat.
- D. Touch-Up Materials: As furnished by terracotta tile manufacturer.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, cladding assembly supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural support members and anchorage have been installed within alignment tolerances required by terracotta tile 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 terracotta tile 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 according to ASTM C754 and terracotta tile manufacturer's written recommendations.
- B. Establish lines, levels and shims as required. Protect from disturbance.

3.3 INSTALLATION

- A. General: Install terracotta tiles according to manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor terracotta tiles and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving terracotta tiles.
 - 2. Install flashing and trim as terracotta tile work proceeds.
- B. Do not install broken, chipped or cracked units.
- C. Install anchor channels and clips as indicated and in accordance with manufacturer's instructions.
- D. Install sufficient anchorage devices to securely and rigidly fasten system to building. Fasteners to be concealed.
- E. Provide anchors to be installed in other work, and setting details, in time for proper installation by trades concerned; verify correct placement.
- F. Lay terracotta tile units on mounting clips properly jointed with other work.
 - 1. Place terracotta tile units in accordance with lines and levels indicated, in strict accordance with manufacturer's instructions.
 - 2. Take care to prevent damage to terracotta tile units.
 - 3. Install system to allow adequate clearances around perimeter and to enable proper installation.
- G. Assemble and anchor various components to allow for expansion and contraction, maintaining watertight condition.
- H. Ensure assembly is plumb, level and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.
- I. Allow moisture entering joints and condensation occurring within cavity to drain to exterior.
- J. Apply coat of bituminous paint on concealed aluminum surfaces to be in contact with steel, cementitious, or dissimilar materials.
- K. Set terracotta tile units in stack bond unless otherwise indicated.
- L. Tolerance: Accurately align and locate components to column lines and floor levels; adjust work to conform with following tolerances.
 - 1. Plumb: 1/8" in 10' -0"; 1/4" in 40' -0"; non-cumulative.
 - 2. Level: 1/8" in 20' -0"; 1/4" in 40' -0"; non-cumulative.
 - 3. Alignment: limit offset to 1/6" where surfaces are flush or less than 1/2" out of flush, and separated by less than 2" (by reveal or protruding work); otherwise limit offsets to 1/8".
 - 4. Location: 3/8" maximum deviation from measured theoretical location (any member, and location).
- M. Built-In Work:

1. As work progresses, build in anchor bolts, flashing and other items supplied by other trades.
2. Install items plumb and true.
3. Do not build in organic materials subject to rot or deterioration.
4. Remove protective film from finished aluminum surfaces.

N. Cutting:

1. When field cutting is undertaken, care shall be exercised to ensure that cuttings do not remain on exposed surfaces.
2. All mitered cuts should be factory cuts.

3.4 CLEANING

- A. Clean soiled surfaces using materials which will not harm terracotta tile units or adjacent materials.
- B. Consult terracotta tile manufacturer for acceptable cleaners. Use non-metallic tools in cleaning operations.
- C. Upon completion of installation, remove protective coatings or coverings and clean aluminum surfaces, exercising care to avoid damage of finish.
- D. Remove excess sealant compounds, dirt or other foreign substances.
- E. Remove and replace terracotta tile units that are broken, chipped, cracked, abraded or damaged during construction period. Reinstall in accordance with manufacturer's instructions.

END 07 42 29.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 42 93 - Soffit Panels

PART 1 - GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

- 1. Metal soffit panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication 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.
- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Product test reports.
- B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 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. Warranty Period: Two years from date of Substantial Completion.

- 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. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- B. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- D. 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.

2.3 METAL SOFFIT PANELS

- A. Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ATAS International, Inc.
 - b. Berridge Manufacturing Company.
 - c. CENTRIA Architectural Systems.
 - d. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
2. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.040 inch.
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Two-coat fluoropolymer.
 - d. Color: As selected by Architect from manufacturer's full range.

2.4 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, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. 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. 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. Finish flashing and trim with same finish system as adjacent metal panels.
- D. 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.
- E. Panel Sealants: Provide sealant types 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; 1/8 inch thick.
 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.5 FABRICATION

- A. 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 recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.6 FINISHES

- A. Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.
 - 1. Soffit Framing: Wire tie furring channels to supports, as required to comply with requirements for assemblies indicated.

3.2 INSTALLATION

- A. Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 - 1. Apply panels and associated items true to line for neat and weathertight enclosure.
 - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.

3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. 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 as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

- 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.

END 07 42 93.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 54 19 - PVC/Kee Membrane Roofing

1. GENERAL

A WORK INCLUDES

1. Base Bid:

- a) General Contractor provide single-ply PVC / KEE fully adhered membrane roofing and flashing system as shown and herein specified.

(1) Install new:

- (a) Vapor retarder.
- (b) Insulation.
- (c) Coverboard.
- (d) PVC Roof membrane
- (e) Base flashing.
- (f) Roof projection flashings.
- (g) Roof drain flashings.
- (h) Termination bar.
- (i) Walkway pads.
- (j) Counterflashing.
- (k) Gravel stops.
- (l) Scuppers.
- (m) Coping cap.
- (n) Equipment curbs.
- (o) Expansion joints.
- (p) Pourable Sealer pocket.

2. Materials installed but furnished by others:

B RELATED WORK

1. Specified elsewhere:

- a) 06 10 00 - Rough Carpentry.
- b) 07 62 00 - Sheet Metal Flashing & Trim.
- c) 07 70 00 - Roof Specialties & Accessories.
- d) 07 92 00 - Sealants & Caulking.
- e) 22 14 26 - Roof Drainage Systems.
- f) 26 41 00 - Lightning Protection Systems

- C DEFINITIONS Roofing System Manufacturer: Any of the manufacturers whose systems are specified under "Acceptable Roofing System Manufacturers" in this section hereinafter called "manufacturer."

D QUALITY ASSURANCE

1. Qualifications:

- a) The installing contractor shall be approved or franchised by the roofing system manufacturer.
- b) The job foreman shall be trained by the manufacturer in the installation of the specified system.

- c) The installing contractor shall comply with the Illinois Roofing Industry Licensing Act.

2. Manufacturer's Qualifications:

- a) The A/E has certificates (CDB Form RSMC) on file from each of the specified manufacturers stating:
 - (1) They have examined project drawings, specifications and warranty requirements.
 - (2) Their specified products are acceptable for and compatible with the roofing and flashing system design.
 - (3) They will issue the specified warranty if the roofing and flashing systems are installed in accord with their requirements.

E REFERENCES

1. Cited Standards and specified manufacturers' catalogs, current at the date of bidding documents, unless otherwise specified, are incorporated herein by reference and govern the work. If conflict is discovered between referenced Standards or catalogs and the project specifications, request written clarification from the A/E. Do not proceed with the work until receiving clarification.
2. Standards:
 - a) American Society for Testing and Materials (ASTM).
 - b) Factory Mutual Laboratories (FM).
 - c) Underwriters Laboratories (UL)
 - d) Sheet Metal and Air Conditioning Contractors National Assoc. (SMACNA)
 - e) EPA – Energy Star Roof Products
 - f) Cool Roof Ratings Council

F SUBMITTALS

1. Make all submittals in accord with the Standard Documents for Construction, Section 01 33 23.
2. Endorsement of Roofing Firm: Contractor: Within 15 days of receiving the Notice of Award, submit the manufacturer's endorsement of the installing firm.
3. Shop Drawings:
 - a) Submit shop drawings to the manufacturer for review and comment.
 - b) Submit only manufacturer reviewed shop drawings to the A/E.
 - c) Minimum Scale for Roof Plan: 1/8" = 1' 0".
 - d) Minimum Scale for Details: 1-1/2" = 1' 0".

e) Submit the following:

- (1) Tapered roof insulation plan.
- (2) Insulation fastener pattern.
- (3) Base flashings.
- (4) Reglets.
- (5) Membrane terminations.
- (6) Roof projection flashings.
- (7) Roof drains.
- (8) Sheet metal

- (a) Counterflashing.
- (b) Gravel stop/fascia.
- (c) Scupper.
- (d) Copings.
- (e) Equipment curbs.
- (f) Gutters and downspouts.

4. Samples:

- a) Roof insulation, 8" x 10, 2 pieces.
- b) Insulation fastener and plate, 2 of each.
- c) PVC membrane, 4" x 6", 3 pieces.
- d) Sheet Metal:

- (1) Metal used with roofing, 4" x 4" of each type, 3 pieces.
- (2) Expansion joint cover, 4" length, 2 pieces.

5. Product Data:

- a) Manufacturer's specifications for roofing system, 2 sets.
- b) Roof insulation specifications, 2 sets.

G DELIVERY, STORAGE AND HANDLING

1. Per roofing manufacturer's recommendations.
2. Deliver materials requiring fire resistant classifications packaged with labels intact and legible.

H JOB CONDITIONS

1. Protection:

- a) Protect roof membrane, building surfaces, paving, and landscaping from traffic and roofing equipment.
- b) Restore or replace all work or materials damaged by the roofing operation.

- c) Remove protection materials upon completion of the work.
- 2. Sequencing, Scheduling Coordination: In accord with the Standard Documents for Construction, Section 01 31 20.
- 3. Comply with all regulations imposed by the using agency at the job site.

I WARRANTY

- 1. General Contractor: Two years in accord with the Standard Documents for Construction, Section 01 78 36.
- 2. Manufacturer: Execute CDB's Roofing System Manufacturer's Warranty - CDB Form RSMW. See the final pages of this section.

2. PRODUCTS

- A MATERIALS For the entire roofing system provide adhesives, sealants, pre-molded and field fabricated flashings, fasteners, and other related components manufactured or recommended by the selected manufacturer.

B ACCEPTABLE PVC ROOFING SYSTEM MANUFACTURERS

<u>CODE</u>	<u>BRAND</u>	<u>MANUFACTURER</u>
1. CAR	Sure-Flex	Carlisle SynTec System, Carlisle, PA
2. FIB	Fibertite	Seaman Corp., Wooster, OH
3. FLX	Flex	Flex Membrane, Leesport, PA
4. GAF	EverGuard	GAF Building Materials Corp, Wayne, NJ.
5. MAN	JM PVC	Johns-Manville, Denver, CO.
6. MHP	Mule-Hide	Mule-Hide Products Co., Inc., Beloit, WI
7. SAR	Sarnafil	Sarnafil Inc., Canton, MA
8. VER	VersiFlex	Versico Inc., Akron, OH

C ACCEPTABLE SYSTEMS

- 1. Fully Adhered .050/.060 PVC / KEE

a)	CAR	Sure-Flex
b)	FIB	Fibertite-SM
c)	FLX	Flex PVC
d)	GAF	EverGuard
e)	MAN	JM PVC
f)	MHP	PVC
g)	SAR	Sarnafil
h)	VER	VersiFlex

1. INSULATION TYPE

a) BASE INSULATION	<u>ASTM</u>	<u>R/INCH</u>
(1) Fiberboard	C612	2.78
(2) Perlite	C728	2.78
(3) Extruded Polystyrene	C578, Type IV	5.00
(4) Polyisocyanurate	C1289	5.70
(5) Mineral Wool Fiber	C726	3.80

b) COVERBOARD ($\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ")

- (1) Dens Deck Prime – Georgia Pacific
- (2) Securock – United States Gypsum
- (3) DEXcell – National Gypsum

or

- (1) Isogard HD – Firestone
- (2) Invinsa – Johns Manville
- (3) SecurShield HD – Carlisle
- (4) HShield – Hunter Panels

2. Roof Insulation for Tapered Areas:

- a) (* [type]) Minimum Thickness: (* inches) Slope: (* in./ft.)
- b) (*) Crickets & Saddles: (* [type]) Slope: (* in./ft.)
- c) (*) ($\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ") coverboard.

3. Roof Insulation for Non-Tapered Areas:

- a) First Layer: (* [type]) Thickness: (* inches)
- b) Second Layer: (* [type]) Thickness: (* inches)
- c) (*) Crickets & Saddles: (* [type]) Slope: (* in./ft.)
- d) (*) ($\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ") coverboard

E INSULATION ATTACHMENT

- 1. Fasteners manufactured or approved by the roofing system manufacturer, and that have Factory Mutual approval.
- 2. Adhesive manufactured or approved by the roofing system manufacturer, and that have Factory Mutual approval.

F OTHER MATERIALS

- 1. Wood Nailers: Wood shall be No. 2 or better construction grade lumber.

2. Manufacturer's PVC Flashing.
3. Vapor Retarder:
4. Termination Bar: Required by CDB on all wall terminations. **Attach 6" o.c.**
 - a) 040" x 1" aluminum bar under counterflashing or other restricted spaces.
 - b) 1/8" x 1-1/2" aluminum bar with 45° sealant pocket where space permits.
5. PVC Walkway Pads: Furnished by the roofing manufacturer.

G METAL FLASHINGS

1. Counterflashing:
2. Expansion Joint Cover:
3. Coping cap:
4. Gravel stop/fascia:
5. Gutters & Downspouts: No plain galvanized.

3. EXECUTION

A ENVIRONMENTAL CONDITIONS

1. Remove existing roofing only in dry weather.
2. Install roofing only in dry weather.
3. Comply with manufacturer's climatic restrictions.

B INSPECTION

1. Examine all surfaces for inadequate anchorage, foreign material, moisture, unevenness, or other conditions which could prevent the best quality and longevity of roofing, flashing, and accessory components. Notify the A/E of all deficiencies.
2. Do not proceed with the work until all deficiencies have been corrected to the satisfaction of the A/E and the roofing manufacturer.

C PREPARATION

1. Ensure that all surfaces are clean and dry before starting and during performance of work.
2. Verify that all work of other contractors and subcontractors which penetrates the roof deck or requires men and equipment to traverse the roof deck has been completed.

D INSTALLATION

1. Install the roof insulation with end joints staggered at mid-point in each layer. Offset all joints between layers a minimum of six inches.

- a) Attach insulation per manufacturer's recommendations.
2. Install the roofing and flashing system and all accessory items in accord with the manufacturer's printed instructions.
3. Weld all field seams using the manufacturer's approved welding equipment and in accord with the manufacturer's recommendations.

E FIELD QUALITY CONTROL

1. The A/E will provide onsite observation during installation.
2. The roofing manufacturer will provide onsite observation and instruction as they deem necessary.

F ADJUST AND CLEAN

1. Carefully inspect all completed work and correct all defects.
2. Remove from the job site and legally dispose of all debris.
3. Remove all tools, equipment, and construction aids.
4. Prevent storage of materials and equipment on the completed roof.
5. Accompany the manufacturer's technical inspector and assist with equipment and workmen if necessary to provide access to the roof. Correct all defects noted during the inspection.

NOTE: The RSMW is on the next two pages of this Section. Complete the known information and edit the Weathertight Warranty length before inserting as the final pages of Section 07 54 19.

State of Illinois

CAPITAL DEVELOPMENT BOARD

025-0398

RSMW

Roofing System Manufacturer's Warranty

Manufacturer's Warranty Number(s):

FOR CDB USE ONLY	
P. M. Name	_____
Project No:	_____
Contract	_____
C.F. Locale:	Contractor #7

Effective Date:

Ending Date:
Warranty Length:

Metal Finish

Manufacturer Name:

Watertight Warranty Length: (*15) (*20) Years

Telephone #.:

Fax #:

CDB Project No.

E-Mail:

CDB Project Manager:

Address:

Agent: Capital Development Board, 3rd Floor,
Stratton Building, Springfield, IL 62706

Total Warranty - Square Footage:

Using Agency:

Roof Specification-System Name:

Site Address:

Lin. Ft. Flashing:

Building Name:

Lin. Ft. Expansion Joint Covers:

CDB Building No.:

Insulation Type(s):

Identify Area of Work:

Roofing Contractor:

Additional Building(s):

Address:

Site Address:

Telephone No.:

FAX:

Building Name:

Other Information:

CDB Building No.:

Identify Area of Work:

**Note: Contractor to complete information above
and Section II dollar amount, below.**

**Note: A/E to edit Warranty length & complete
information above**

WARRANTY

I.THE ROOFING SYSTEM MANUFACTURER hereinafter called "Manufacturer" acknowledges that it has previously reviewed the drawings and specifications for the roofing system and certified that the design is acceptable for this Warranty. The Manufacturer warrants to the Building Owner named above, that, subject to the provisions of this document, the Manufacturer will, at its own expense, make or cause to be made all

repairs necessary to maintain the roofing system in a watertight condition during the warranty period stated above which commences on the date of accepted Substantial Completion of the roofing system. System includes:

- A. Membrane(s).
- B. Flashings (except metal or components not furnished by the Manufacturer as part of its advertised system).
- C. Insulation.
- D. Fasteners and adhesives.

I.LIMITATIONS. The Manufacturer's liability under this Warranty is limited to (\$) which is the Owner's original installed cost of the roofing system per CDB Contractor Schedule of Values (CSV).

PAGE 2 of 2

I.OWNER'S RESPONSIBILITY. The Owner will notify the Manufacturer if repairs covered by the Warranty are required. The notice will be by, Telephone, Fax, E-mail, or Mail, to the Manufacturer's office specified in the Manufacturer's Maintenance Manual within 30 days of discovery of leaks or other defects in the roofing system. The Owner will provide the Manufacturer free access to the building during regular business hours over the life of the Warranty. The Owner acknowledges that the Manufacturer has provided its Roofing Maintenance Manual, including instructions necessary for the Owner to inspect and maintain the roofing system during the warranty period.

I.EXCLUSIONS. The following are excluded from this Warranty:

- A. Roof maintenance for corrections of conditions other than leaks.
- B. Damage to any part of the building (other than the roofing system) or to its contents.
- C. Damage resulting from repairs made to the roofing system without the Manufacturer's prior authorization.
- D. Damage resulting from any one of the following:
 - 1. Settlement, expansion, contraction, cracking, warping, deflection or movement of roof deck, walls, coping structural members or building foundation.
 - 2. Natural disasters (i.e., windstorm, hail, flood, hurricane, cyclone, lighting, tornado or earthquake).
 - 3. Changes in building usage; new installations on, through or adjacent to the roofing system made after the effective date of this Warranty, unless the Manufacturer has given prior written approval of such changes in building usage or new installations.
 - 4. Accidents, vandalism or other uncontrollable events.
 - 5. Lack of positive drainage (standing water) for asphalt built-up systems.
 - 6. Chemical attacks on the membrane from sources unknown or not present at time of roofing system.
 - 7. Falling objects, misuse or abuse of the roofing system, traffic, recreational activities or storage of material on the roofing system.
 - 8. Infiltration or condensation of moisture in, through or around walls, copings, building structure or underlying or surrounding areas.
 - 9. Movement or deterioration of metal components adjacent to the roof (except where such components are a part of the Manufacturer's advertised roofing system).
 - 10. Failure of materials supplied by others (except where such materials are a part of the specified roofing system certified by the Manufacturer prior to bidding the roofing work).
 - 11. Tests of test cuts not authorized by the Manufacturer.
 - 12. Failure of the Owner to provide maintenance in accord with the Roofing Maintenance Manual.
 - 13. Failure of the Owner to notify the Manufacturer of leaks or other defects within 30 days of discovery.

- A. The implied warranties of merchantability and fitness for a particular purpose are excluded.

In Witness Whereof: Manufacturer and Owner have caused this Warranty to be duly executed on the dates below.

MANUFACTURER:

OWNER:

a State of Corporation with principal office at:

ADDRESS:

BY: _____

BY: _____

TITLE:

TITLE:

DATE:

DATE:

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 62 00 - Sheet Metal Flashing and Trim

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Formed low-slope roof sheet metal fabrications.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Distinguish between shop- and field-assembled work.
3. Include identification of finish for each item.
4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Product certificates.

- C. Product test reports.

- D. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- 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. Build mockup of typical coping, approximately 10 feet.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Finish Warranty Period: 20 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
 1. Design Pressure: As indicated on Drawings, or if not indicated as directed by Architect.
- D. 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: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
 - 1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color: Match Architect's sample.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; 2D (dull, cold rolled) finish.
- D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: Manufacturer's standard clear acrylic coating on both sides.
 - 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Color: As selected by Architect from manufacturer's full range.

2.4 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer. Verify compatibility of sheet's adhesive with materials coming into contact with it with sheet's manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. Grace Construction Products; W.R. Grace & Co. -- Conn.
 - c. Henry Company.
 - d. Owens Corning.
 - 2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.

3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.5 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Solder:
 1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricated, two-piece roof-edge fascia consisting of metal fascia cover in lengths of 96-inched- to 12-feet- and a continuous formed galvanized-steel sheet cant, with extended vertical leg terminating in a drip-edge cleat. Furnish with 6-inch- wide, joint cover plates. Shop fabricate matching corner units.
 - 1. Fabricate from the Following Materials:
 - a. Aluminum: 0.050 inch thick.
 - b. Surface: Smooth, flat finish.
- B. Copings: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with exterior face leg hooked to concealed continuous galvanized-steel sheet cleat with roof side back leg fastener exposed. Shop fabricate interior and exterior corners, factory mitered and continuously welded. Fasten and seal watertight

1. Fabricate from the Following Materials:

- a. Aluminum: 0.040 inch thick.
- b. Surface: Smooth, flat finish.

C. Base Flashing: Fabricate from the following materials:

- 1. Galvanized Steel: 0.028 inch thick.

D. Counterflashing: Fabricate from the following materials:

- 1. Galvanized Steel: 0.022 inch thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:

- 1. Stainless Steel: 0.019 inch thick.

F. Roof-Drain Flashing: Fabricate from the following materials:

- 1. Stainless Steel: 0.016 inch thick.

3. EXECUTION

4. EXECUTION

4.1 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature and compatibility restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, 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 and edges with roller. Cover underlayment within 14 days.

4.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
- 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 5. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener 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. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

4.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches.

- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with buty sealant and clamp flashing to pipes that penetrate roof.

4.4 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.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END 07 62 00

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 72 00 - Roof Accessories

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Roof hatches.

1.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
1. Size and location of roof accessories specified in this Section.
 2. Method of attaching roof accessories to roof or building structure.
 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
 4. Required clearances.
- C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.6 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
 - 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.
 - 2. Concealed Finish: Pretreat with 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.
- B. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.
- C. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- D. Steel Tube: ASTM A 500, round tube.
- E. Galvanized-Steel Tube: ASTM A 500, round tube, hot-dip galvanized according to ASTM A 123/A 123M.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness as indicated.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Underlayment:
 - 1. Self-adhering bituminous flashing membrane compatible with roof air barrier.

2. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.
- E. 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:
 1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - F. 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.
 - G. Elastomeric Sealant: ASTM C 920, elastomeric silicone 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.
 - H. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
 - I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AES Industries, Inc.
 - b. Babcock-Davis.
 - c. Bilco Co.
 - d. J. L. Industries, Inc.
 - e. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - f. Pate Company (The).
- B. Type and Size: Single-leaf lid, 48 by 96 inches, unless otherwise indicated.
- C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.
- D. Hatch Material: Zinc-coated (galvanized) steel sheet.
 1. Thickness: Manufacturer's standard thickness for hatch size indicated.
- E. Construction:
 1. Insulation: Polyisocyanurate board, 2" thickness (R-12).

2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
 3. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
 4. Fabricate curbs to minimum height of 12 inches unless otherwise indicated.
- F. Hardware: Galvanized-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.
- G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bilco Bil-Guard Type ND
 - b. JL Industries SHG-2436
 - c. Babcock-Davis SRCG30x54SG
 2. Height: 42 inches above finished roof deck.
 3. Posts and Rails: Powder coated galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter or manufacturer's standard FRP.
 4. Flat Bar: Galvanized steel, 2 inches high by 3/8 inch thick.
 5. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches in diameter.
 6. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
 7. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
 8. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
 9. Fabricate joints exposed to weather to be watertight.
 10. Fasteners: Manufacturer's standard, finished to match railing system.
 11. Finish: Manufacturer's standard safety yellow.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: 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, excessive oil canning, 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. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with a slip sheet.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Roof-Hatch Installation:
 - 1. Install roof hatch so top surface of hatch curb is level.
 - 2. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
 - 3. Attach safety railing system to roof-hatch curb.
- D. Seal joints with elastomeric sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.
- B. Clean exposed surfaces according to manufacturer's written instructions.

- C. Clean off excess sealants.
- D. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END 07 72 00.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 84 13 - Penetration Firestopping

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Through-penetration firestop systems for penetrations through fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items.

1.2 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: If acceptable to authorities having jurisdiction, where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project

names and addresses, names and addresses of architects and owners, and other information specified.

- C. Installer Certificates: From Installer indicating penetration firestopping systems have been installed in compliance with requirements and manufacturer's written recommendations.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements;" who has completed through-penetration firestopping systems similar in material, design, and extent to that indicated for this Project, on not less than 3 projects, to the satisfaction of the Architect; and whose work has resulted in construction with a record of successful in-service performance for a period of 5 years.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestopping system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

- C. Notify testing agency at least seven days in advance of the date when penetration firestopping installations will be complete and ready for examination; confirm dates and times on day preceding each series of installations.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. For the following constructions, provide through-penetration firestopping systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated floor assemblies and roof assemblies (if any).
- B. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency acceptable to authorities having jurisdiction.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."

2.3 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M Fire Protection Products.
 - 2. A/D Fire Protection Systems Inc.
 - 3. Grabber Construction Products.
 - 4. Hilti, Inc.
 - 5. RectorSeal.
 - 6. Specified Technologies, Inc.
 - 7. Tremco, Inc.

2.4 PENETRATION FIRESTOPPING SYSTEMS

- A. General: Provide penetration firestopping systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. VOC Content: Sealants and sealant primers shall comply with the following:
 - a. Sealants shall have a VOC content of 250 g/L or less.
 - b. Sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 - c. Sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
 - 1. Sealant shall have a VOC content of 250 g/L or less.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 - 1. Permanent forming/damming/backing materials, including but not limited to the following:

- a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
- 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.5 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- F. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.
- L. Outlet Box Protection: Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
1. 3M Fire Protection Products; 3M Fire Barrier Moldable Putty Pads MPP+.
 2. A/D Fire Protection Systems Inc.; Putty Pads and Putty Pads II.
 3. Hilti Constructions Chemicals, Inc.; Firestop Putty Pads.
 4. Nelson Firestop Products; FSP Firestop Putty.
 5. Rectorseal Corp.; Metacaulk and Biostop Series Putty Pads.

2.6 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with manufacturer's written instructions and the following requirements:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestopping materials.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

- C. Masking: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- D. Outlet Box Protection: Install outlet box protective firestop pads for outlet boxes in fire-rated assemblies in accordance with manufacturer's written instructions.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
- B. Penetration Identification: Identify each penetration firestopping system with legible plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use self-adhering type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:

1. The words "Warning – Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated through-penetration firestopping systems and install new materials to produce through-penetration firestopping systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

PENETRATION DESCRIPTION	UL CLASSIFIED SYSTEM	FILL MATERIAL
Firestopping Systems with No Penetrating Items	C-AJ-0001-0999 C-BJ-0001-0999 F-A-0001-0999 W-J-0001-0999 W-L-0001-0999	Latex sealant Silicone sealant Mortar Intumescent putty

Firestopping Systems for Metallic Pipes, Conduit, or Tubing	C-AJ-1001-1999 C-BJ-1001-1999 C-BK-1001-1999 F-A-1001-1999 F-B-1001-1999 F-C-1001-1999 F-E-1001-1999 W-J-1001-1999 W-K-1001-1999 W-L-1001-1999	Latex sealant Silicone sealant Mortar Intumescent putty
Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing	C-AJ-2001-2999 C-BJ-2001-2999 C-BK-2001-2999 F-A-2001-2999 F-B-2001-2999 F-C-2001-2999 W-J-2001-2999 W-K-2001-2999 W-L-2001-2999	Latex sealant Silicone sealant Intumescent putty Intumescent wrap strips Firestop device
Firestopping Systems for Electrical Cables	C-AJ-3001-3999 C-BJ-3001-3999 C-BK-3001-3999 F-A-3001-3999 F-B-3001-3999 F-C-3001-3999 W-J-3001-3999 W-L-3001-3999	Latex sealant Silicone sealant Intumescent putty Silicone foam
Firestopping Systems for Cable Trays	C-AJ-4001-4999 C-BJ-4001-4999 F-A-4001-4999 F-B-4001-4999 F-C-4001-4999 W-J-4001-4999 W-K-4001-4999 W-L-4001-4999	Latex sealant Intumescent putty Silicone foam Pillows/bags
Firestopping Systems for Insulated Pipes	C-AJ-5001-5999 C-BJ-5001-5999 F-A-5001-5999 F-B-5001-5999 F-C-5001-5999 W-J-5001-5999 W-L-5001-5999	Latex sealant Intumescent putty Intumescent wrap strips Silicone foam
Firestopping Systems for Miscellaneous Electrical Penetrants	C-AJ-6001-6999 F-A-6001-6999 W-J-6001-6999 W-L-6001-6999	Latex sealant Intumescent putty Mortar
Firestopping Systems for Miscellaneous Mechanical Penetrations	C-AJ-7001-7999 C-BJ-7001-7999 F-A-7001-7999 F-C-7001-7999 W-J-7001-7999 W-L-7001-7999 W-N-7001-7999	Latex sealant Mortar

Firestopping Systems for Groupings of Penetrants	C-AJ-8001-8999 C-BJ-8001-8999 F-A-8001-8999 F-B-8001-8999 F-C-8001-8999 W-J-8001-8999 W-L-8001-8999	Latex sealant Mortar Intumescent wrap strips Firestop device Intumescent composite sheet.
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END 07 84 13.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 84 43 - Joint Firestopping

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Joints in or between fire-resistance-rated constructions.
 - 2. Joints in smoke barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer.
- C. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."

2.3 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Grabber Construction Products.
 - d. Hilti, Inc.
 - e. Nelson Firestop; a brand of Emerson Industrial Automation.
 - f. RectorSeal.
 - g. Specified Technologies, Inc.
 - h. Tremco, Inc.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.
 - d. Nelson Firestop; a brand of Emerson Industrial Automation.
 - e. RectorSeal.
 - f. Specified Technologies, Inc.
 - g. Tremco, Inc.
 2. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- D. Joints at Exterior Curtain-Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E 2307.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. Roxul Inc.
 - c. Specified Technologies, Inc.
 - d. Thermafiber, Inc.; an Owens Corning company.
 2. F-Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
- E. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
1. Sealant shall have a VOC content of 250 g/L or less.
- F. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required.

Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.

3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use self-adhering type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

JOINT DESCRIPTION	UL SYSTEM	NOMINAL JOINT WIDTH	UL CLASSIFIED SYSTEMS	ASSEMBLY RATING	JOINT MATERIAL
Floor to Floor	FF-D	As Indicated	0001-0999 1000-1999 2000-2999 3000-3999 4000-4999	2 Hours	Latex Sealants Silicone Sealants
Wall to Wall	WW-D	As Indicated	0001-0999 1000-1999 2000-2999 3000-3999 4000-4999	2 Hours	Latex Sealants Silicone Sealants
Floor to Wall	FW-D	As Indicated	0001-0999 1000-1999 2000-2999 3000-3999 4000-4999	2 Hours	Latex Sealants Silicone Sealants
Head of Wall	HW-D	As Indicated	0001-0999 1000-1999 2000-2999 3000-3999 4000-4999	2 Hours	Latex Sealants Silicone Sealants
Perimeter	CW-D	As indicated	0001-0999 1000-1999 2000-2999	2 Hours	Spray Applied

- A. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under product category Expansion/Seismic Joints or Firestop Systems.

END 07 84 43.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 92 00 - Substitution Procedures

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Solvent-release-curing joint sealants.
4. Latex joint sealants.
5. Preformed joint sealants.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:
 - a. Each kind of sealant and joint substrate indicated.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. 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.

- 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 018113 "Sustainable Design Requirements" for submittal requirements.
- B. 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.
- C. Qualification Data: For qualified Installer and testing agency.
- D. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- E. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- G. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- I. Field-Adhesion Test Reports: For each sealant application tested.
- J. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
- D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
- E. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which 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 years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period:
 - a. Urethane Sealants: 10 years from date of Substantial Completion.
 - b. Silicone Sealants: 20 years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Colors of Exposed Joint Sealants: Match Architect's samples.

2.3 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 790.
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - c. Sika Corporation, Construction Products Division; SikaSil-C990.
 - d. Tremco Incorporated; Spectrem 1.
- B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - d. Tremco Incorporated; Tremsil 200 Sanitary.

2.4 URETHANE JOINT SEALANTS

- A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT and T.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic NP1.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - c. Tremco Incorporated; Vulkem 116.
- B. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT and T.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic NP 2.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
 - c. Tremco Incorporated; Vulkem 227.
- C. Multi-Component Nonsag Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
 1. Products: Available products include the following :
 - a. Lymtal International, Iso-Flex 881.
 - b. Pecora Corporation, Dynatrol II
 - c. Sika Corporation, Sikaflex 2c NS.
 - d. Tremco, Dymeric 240.
 2. Type and Grade: M (multi component) and NS (nonsag).
 3. Class: 25.
 4. Use(s) Related to Exposure: NT (nontraffic).

5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 6. Applications:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Other exterior, non traffic joints for which no other sealant is indicated.
- D. Multi-Component Pourable Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
1. Products: Available products include the following :
 - a. LymTal International, Iso-flex 880GB;
 - b. Pecora Corporation, Dynatrol II-SG.
 - c. Sika Corporation, Sikaflex 2c SL.
 - d. Tremco, THC-900.
 2. Type and Grade: M (multi component) and P (pourable).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic) .
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
 6. Applications:
 - a. Joints between concrete.
 - b. Other exterior, traffic joints such as for between post-tensioned slabs, and for which no other sealant is indicated.

2.5 SOLVENT-RELEASE-CURING JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealant: ASTM C 1311.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik, Inc.; Chem-Calk 300.
 - b. Pecora Corporation; BC-158.
 - c. Tremco Incorporated; Tremco Butyl Sealant.

2.6 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolac.
 - b. Schnee-Morehead, Inc.; SM 8200.
 - c. Tremco Incorporated; Tremflex 834.

2.7 PREFORMED JOINT SEALANTS

- A. Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 123 Silicone Seal.
 - b. GE Advanced Materials - Silicones; UltraSpan US1100.
 - c. Sika Corporation, Construction Products Division; Sikasil Bridge 300.
- B. Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane 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 indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dayton Superior Specialty Chemicals; Polytite Standard.
 - b. EMSEAL Joint Systems, Ltd.; Emseal 25V.
 - c. Sandell Manufacturing Co., Inc.; Polyseal.

2.8 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 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, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

3. EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or

by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
 - 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.

2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 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 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 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.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- 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.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

TYPE	POLYMER	EXPOSURE /TRAFFIC	COLOR	USES/APPLICATIONS
Elastomeric	Silicone: Low modulus; Medium Modulus	Exterior joints in vertical surfaces and non-traffic horizontal surfaces	Selected by Architect from manufacturer's full range	<ul style="list-style-type: none"> Control and expansion joints in cast-in-place concrete. Joints in metal panels. Windows and between windows and other materials. Storefront and entrances and between storefront and entrances and other materials. Joints between materials listed above and frames of doors and windows. Control and expansion joints in soffit and overhead surfaces. Other joints as indicated.
Elastomeric	STPe Joint Sealant	Contractor's Option: Exterior perimeter joints where indicated.	Selected by Architect from manufacturer's full range	<ul style="list-style-type: none"> Perimeter joints between terrace doors and other frames where joint contacts traffic coatings.

TYPE	POLYMER	EXPOSURE /TRAFFIC	COLOR	USES/APPLICATIONS
Elastomeric	Silicone: Low modulus; Medium Modulus or One-part Urethane	Interior moving joints in vertical surfaces and horizontal nontraffic surfaces	Selected by Architect from manufacturer's full range	<ul style="list-style-type: none"> • Control and expansion joints on exposed interior surfaces of exterior walls. • Perimeter joints of exterior openings where indicated. • Joints between tops of non-load-bearing, non-fire rated unit masonry walls and underside of structure above. • Tile control joints (In non-wet areas). • Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions. • Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
Elastomeric	Mildew-Resistant Silicone	Interior wet areas	White	<ul style="list-style-type: none"> • Perimeter of plumbing fixtures and tile surfacing. • Between tile backing board and plumbing fixtures.
Elastomeric	Two-Part Urethane	Interior horizontal traffic joints	Selected by Architect from manufacturer's full range	<ul style="list-style-type: none"> • Paving and flooring control and expansion joints • Isolation joints in cast in place concrete slabs. • Joints in tile flooring, except in interior wet areas.
Solvent Release Sealants	Butyl Sealant	Interior or Exterior concealed joints	Manufacturer's standard	<ul style="list-style-type: none"> • Concealed sheet metal sealants • Sealing thresholds.

END 07 92 00.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 92 19 - Acoustical Joint Sealants

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples for Verification: For each kind and color of acoustical joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Acoustical-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.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.4 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

2.3 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
 - b. Hilti, Inc.
 - c. Pecora Corporation.
 - d. Tremco Incorporated.
 - e. USG Corporation.
 - 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

3. EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END 07 92 19.

DIVISION 08 - OPENINGS
Section 08 11 13 - Hollow Metal Doors and Frames

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

B. Product test reports.

C. Field quality control reports.

1.4 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:

1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

- B. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies shall meet the qualifications set forth in NFPA 101, section 7.2.1.15.4 and the following:
 - 1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. DE LA FONTAINE.
 - 4. LaForce, Inc.
 - 5. Steelcraft; an Allegion brand.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.20 deg Btu/F x h x sq. ft. when tested according to ASTM C518.

2.4 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2; SDI A250.4, Level B..

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches.
- c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch.
- d. Edge Construction: Model 2, Seamless.
- e. Core: Manufacturer's standard.
- f. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.

2. Frames:

a. Materials:

- 1) Openings Up To and Including 48-Inches: Uncoated steel sheet, minimum thickness of 0.053 inch.
- 2) Openings More Than 48-Inches: Uncoated steel sheet, minimum thickness of 0.067 inch.

- b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Full profile welded.

2.5 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A..

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches.
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
- d. Edge Construction: Model 2, Seamless.
- e. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
- f. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
- g. Core: Manufacturer's standard.

2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A60 coating.
- b. Construction: Full profile welded.

C. (1.3 mm)FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.8 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

3. EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Hollow-Metal Frames: Comply with SDI A250.11.
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 2. Fire-Rated Openings: Install frames according to NFPA 80.
 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 4. Solidly pack mineral-fiber insulation inside frames.
 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

- B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, section 5.2
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements according to NFPA 101, section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.4 CLEANING AND TOUCHUP

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END 08 11 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Aluminum terrace doors for exterior locations.
- B. Related Requirements:
 - 1. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for coordinating finish among aluminum fenestration units on the building exterior.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of aluminum terrace door.
 - 1. Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions.
- B. Shop Drawings: For aluminum terrace doors.
 - 1. Include plans, elevations, sections, and details; hardware; attachments to other work, and between doors, if any; and operational clearances.
- C. Samples: For each aluminum terrace door and for each color and texture specified, 12-inch-long section with weather stripping, glazing bead and factory-applied color finish.
- D. Product Schedule: For aluminum terrace doors. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer, manufacturer, and testing agency.
- C. Product Test Reports: For each aluminum terrace door, for tests performed by a qualified testing agency; and for each class and performance grade indicated, tested at AAMA gateway size.
- D. Field quality-control reports.
- E. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes, weather stripping, operable panels, and operating hardware to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum terrace doors that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum terrace door manufacturer for installation of units required for this Project.
- C. 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 mockup for aluminum terrace doors, as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of aluminum terrace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection.
 - c. Excessive water leakage or air infiltration.
 - d. Faulty operation of movable panels and hardware.
 - e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - f. Failure of insulating glass.
 - 2. Warranty Period:
 - a. Aluminum Terrace Door: Three years from date of Substantial Completion.
 - b. Insulating-Glass Units: 10 years from date of Substantial Completion.
 - c. Aluminum Finish: 20 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Kawneer North America, an Arconic company.
 - 2. Oldcastle BuildingEnvelope™.
 - 3. YKK AP America Inc.
- B. Source Limitations: Obtain aluminum terrace doors from single source from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Product Certification: AMMA certified with label attached to each door.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: Class LC.
 - 2. Minimum Performance Grade: Grade 50.
- C. Thermal Transmittance: NFRC 100 maximum total fenestration product U-factor of 0.32 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum total fenestration product SHGC of 0.30.
- E. Thermal Movements: Provide aluminum terrace doors, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.4 ALUMINUM TERRACE DOORS

- A. Frames and Door Panels: Fabricated from aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 - 1. Thermally Improved Construction: Fabricate frames and door panels with an integral, concealed, low-conductance thermal barrier located between exterior and interior surfaces in a manner that eliminates direct metal-to-metal contact.
- B. Threshold: Provide extruded-aluminum threshold of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior; with manufacturer's standard finish.
 - 1. Low-Profile Threshold: ADA-ABA compliant.

2.5 GLAZING

- A. Glass and Glazing: Manufacturer's standard glazing system that produces weathertight seal. Comply with requirements indicated in Section 08 80 00 "Glazing."
 - 1. Glass: ASTM C1036, Type 1, q3, Category II safety glass complying with testing requirements in 16 CFR 1201.
 - 2. Safety Glazing Labeling: Permanently mark safety glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
 - 3. Tint: Clear.
 - 4. Insulating-Glass Units: ASTM E2190, certified through IGCC as complying with requirements of IGCC.
 - a. Filling: Fill space between glass lites with air.
 - b. Low-E Coating: Sputtered on second surface.

2.6 HARDWARE

- A. General: Provide manufacturer's standard hardware, fabricated from a corrosion-resistant material compatible with aluminum complying with AAMA 907 and designed to smoothly operate, tightly close, and securely lock aluminum terrace doors.
- B. Lock: Install manufacturer's standard keyed multipoint locking device on each operable panel, lockable from the inside only.
 - 1. Design: As selected from manufacturer's full range.
 - 2. Finish: As selected from manufacturer's full range of finishes.

2.7 ACCESSORIES

- A. Fasteners: Noncorrosive and compatible with door members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- B. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for aluminum terrace doors, complying with ASTM B456 or ASTM B633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

2.8 FABRICATION

- A. Fabricate aluminum terrace doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
- B. Fabricate aluminum terrace doors that are reglazable without dismantling panel framing.
- C. Weather Stripping: Provide full-perimeter weather stripping for each door panel.
- D. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.
- F. Factory-Glazed Fabrication: Glaze aluminum terrace doors in the factory where practical and possible for applications indicated. Comply with requirements in Section 08 80 00 "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color and clear top coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match Architect's sample.

3. EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Work.
- B. Verify rough opening dimensions, levelness of threshold substrate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight aluminum terrace door installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, hardware, accessories, and other components.
- B. Install aluminum terrace doors level, plumb, square, true to line; without distortion, warp, or rack of frames and panels and without impeding thermal movement; anchored securely in place to structural support; and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Install aluminum terrace doors and components to drain condensation, water-penetrating joints, and moisture migrating within doors to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Test and inspect installed aluminum terrace doors as follows:
 - 1. Testing Methodology: Test aluminum terrace doors for air infiltration and water resistance according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.

- b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
- 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
- 4. Testing Extent: Three aluminum terrace doors of each type as selected by Architect and a qualified independent testing and inspecting agency. Conduct tests after perimeter sealants have cured.
- 5. Test Reports: Prepared according to AAMA 502.
- C. Aluminum terrace door will be considered defective if it does not pass tests and inspections.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Lubricate hardware and moving parts.
- B. Adjust operating panels to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and a weathertight closure. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.
- C. Clean exposed surfaces immediately after installing aluminum terrace doors. Avoid damaging protective coatings and finishes. Remove nonpermanent labels, excess sealants, glazing materials, dirt, and other substances.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect aluminum terrace door surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances contact aluminum terrace door surfaces, remove contaminants immediately according to manufacturer's written instructions.
- F. Refinish or replace aluminum terrace doors with damaged finishes.
- G. Replace damaged components.

END 08 13 16.13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Flush wood veneer-faced doors for transparent finish.
 - 2. Flush wood doors for opaque finish.
 - 3. Factory finishing flush wood doors.
 - 4. Factory priming flush wood doors.
 - 5. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 - 1. Door core materials and construction.
 - 2. Door edge construction
 - 3. Door face type and characteristics.
 - 4. Factory-machining criteria.
 - 5. Factory- finishing specifications.
 - 6. Factory-priming specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
 - 1. Door schedule indicating door location, type, size, fire protection rating, and swing.
 - 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 - 3. Details of frame for each frame type, including dimensions and profile.
 - 4. Dimensions and locations of blocking for hardware attachment.
 - 5. Clearances and undercuts.
 - 6. Requirements for veneer matching.
- C. Samples: For factory-finished doors.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with "Architectural Woodwork Standards."

2.4 FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eggers Industries.
 - b. Lambton Doors.
 - c. Oshkosh Door Company.
 - d. VT Industries Inc.
 - 2. Performance Grade: WDMA I.S. 1A Heavy Duty.
 - 3. Architectural Woodwork Standards Grade: Premium.
 - 4. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species: Subject to compliance with requirements, provide wood veneers matching Architect's sample, which has been selected from the species and sources indicated in Finish Schedule on Drawings.
 - b. Cut: Match Architect's sample.
 - c. Match between Veneer Leaves: Match Architect's sample.
 - d. Assembly of Veneer Leaves on Door Faces: Match Architect's sample.
 - e. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet or more.
 - 5. Exposed Vertical and Top Edges: Applied wood edges of same species as faces and covering edges of crossbands - Architectural Woodwork Standards edge Type D.
 - 1) Screw-Holding Capability: 475 lbf in accordance with WDMA T.M. 10.
 - 6. Core for Non-Fire-Rated Doors: ANSI A208.1, Grade LD-1 particleboard.

- a. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
- 7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 FIVE-PLY FLUSH WOOD DOORS FOR OPAQUE FINISH

A. Interior Solid-Core Doors:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eggers Industries.
 - b. Lambton Doors.
 - c. Oshkosh Door Company.
 - d. VT Industries Inc.
- 2. Performance Grade: WDMA I.S. 1A Heavy Duty.
- 3. Architectural Woodwork Standards Grade: Premium.
- 4. Faces: MDO or any closed-grain hardwood, at manufacturer's option.
 - a. Apply MDO to directly to high-density hardboard crossbands.
 - b. Hardboard Faces: ANSI A135.4, Class 1 (tempered) or Class 2 (standard).
- 5. Exposed Vertical and Top Edges: Any closed-grain hardwood.
- 6. Core for Non-Fire-Rated Doors: ANSI A208.1, Grade LD-1 particleboard.
 - a. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
- 7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

- 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied.

- 1. Locate hardware to comply with DHI-WDHS-3.
- 2. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

C. Openings: Factory cut and trim openings through doors.

- 1. Light Openings: Trim openings with moldings of material and profile indicated.

2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

2.7 FACTORY PRIMING

- A. Doors for Opaque Finish: Factory prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 09 91 23" Interior Painting."

2.8 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 2. Finish faces, all four edges, edges of cutouts, and mortises.
 3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors where indicated in schedules or on Drawings as factory finished.
- C. Transparent Finish:
 1. Architectural Woodwork Standards Grade: Premium.
 2. Finish: One of the following:
 - a. Architectural Woodwork Standards System-5, Varnish, Conversion.
 - b. Architectural Woodwork Standards System-11, Polyurethane, Catalyzed.
 3. Staining: Match Architect's sample.
 4. Effect: Open-grain finish.
 5. Sheen: Match Architect's sample.

3. EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 08 71 00 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.

- 1) For factory-finished items, use filler matching finish of items being installed.

- a. (3.2 mm) (3.2 mm) (6.4 mm) Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END 08 14 16.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Access doors and frames for walls and ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of access door and frame and for each finish specified.
- C. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 ACCESS DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - 2. Karp Associates, Inc.
 - 3. Larsens Manufacturing Company.
 - 4. Nystrom.
- B. Flush Access Doors with Exposed Flanges:
 - 1. Description: Face of door flush with frame, with exposed flange and concealed hinge.
 - 2. Locations: Wall and ceiling.
 - 3. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
 - 4. Frame Material: Same material, thickness, and finish as door.
 - 5. Latch and Lock: Cam latch, screwdriver operated, unless otherwise indicated.

C. Flush Access Doors with Concealed Flanges:

1. Description: Face of door flush with frame; with concealed flange for factory-installed gypsum board installation and concealed hinge.
2. Locations: Wall and ceiling.
3. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
4. Frame Material: Same material and thickness as door.
5. Latch and Lock: Cam latch, screwdriver operated, unless otherwise indicated.

D. Fire-Rated, Flush Access Doors with Exposed Flanges:

1. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with exposed flange, self-closing door, and concealed hinge.
2. Locations: Wall.
3. Fire-Resistance Rating: Not less than that of adjacent construction.
4. Temperature-Rise Rating: 250 deg F at the end of 30 minutes.
5. Uncoated Steel Sheet for Door: Nominal 0.036 inch, 20 gage, factory primed.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Self-latching door hardware, operated by key.

E. Fire-Rated, Flush Access Doors with Concealed Flanges:

1. Description: Door face flush with frame, with insulation and closed-cell neoprene gaskets; with concealed flange for plaster/stucco installation, concealed hinge.
2. Locations: Ceiling.
3. Metallic-Coated Steel Sheet for Door: Factory finished.
4. Latch and Lock: Self-latching door hardware, operated by key.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

- A. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- B. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- C. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.
 - 3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in Section 08 71 00 "Door Hardware."

2.5 FINISHES

- A. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

3. EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Adjust doors and hardware, after installation, for proper operation.

3.2 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

END 08 31 13.

DIVISION 08 - OPENINGS

Section 08 41 13 - Aluminum-Framed Entrances and Storefronts

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Exterior and interior storefront framing.
 - 2. Exterior and interior manual-swing entrance doors.
- B. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements."

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. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.

2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

- E. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- B. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Qualification Data: For Installer and field testing agency.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by a qualified testing agency.
- D. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- E. Source quality-control reports.
- F. Field quality-control reports.
- G. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.

- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage an Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
 2. Entrance Doors:
 - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
 - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 12 lbf/sq. ft.
- H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft.
 2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- I. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): According to NFRC 100.
 - a. U-0.26 minimum value for fixed unit system
 - b. U-0.29 minimum value for operable unit system
 2. Solar Heat Gain Coefficient: According to NFRC 200.
 - a. .46 Solar Heat gain coefficient (SHGC) for typical window units
 - b. .56 Solar Heat Gain Coefficient (SHGC) for typical southern facing window units
 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.

- J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
 2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
 - b. Low Exterior Ambient-Air Temperature: 0 deg F.
 - c. Interior Ambient-Air Temperature: 75 deg F.

2.3 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Oldcastle BuildingEnvelope™.
 2. Kawneer North America.
 3. Tubelite Inc.
 4. United States Aluminum.
 5. YKK AP America Inc.
- B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including accessories, from single manufacturer.

2.4 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Thermally broken.
 2. Interior Vestibule Framing Construction: Nonthermal.
 3. Glazing System: Retained mechanically with gaskets on four sides.
 4. Glazing Plane: Front.
 5. Finish: High-performance organic finish.
 6. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

- a. Sheet and Plate: ASTM B 209.
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
- a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
- 1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
 - 2. Door Design: Medium stile; 3-1/2-inch nominal width, unless otherwise indicated on Drawings or directed by Architect.
 - 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.

2.6 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."

2.7 GLAZING

- A. Glazing: Comply with Section 08 80 00 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.

- E. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

- A. High-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color and clear coat.
 - 1. Color and Gloss: Match Architect's sample.

3. EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 - 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.

- E. Install glazing as specified in Section 08 80 00 "Glazing."
- F. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

3.3 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

END 08 41 13.

DIVISION 08 - OPENINGS
Section 08 44 13 - Glazed Aluminum Curtain Walls

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Glazed aluminum curtain walls.
- B. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements" for sustainable design requirements for the building.

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. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 4. Include locations and large-scale details of intermittent stabilization anchors for façade maintenance equipment.
 - 5. Shop drawings must be submitted concurrently with engineering calculations. Shop drawings submitted without calculations shall be returned "Not Reviewed."
- C. Samples for Initial Selection: For units with factory-applied color finishes.

- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
1. Samples of Products Materials: Submit the following:
 - a. Color Samples: 12 inch x 12 inch, each color.
 - b. Finish Samples: 12 inch x 12 inch, each type and finish.
 - c. Finished Extrusions: 12 inch in length, each type.
 - d. Glass: 12 inch x 12 inches, each type and edge finish. Include project name, product name, number, and product data on each sample.
 - e. Flashing: 12 inches x 12 inches, each type. Include lap and splice joining.
 - f. Gaskets: 12 inches long, each type and 12 inches x 12 inches at each corner.
- E. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.
- F. Glass Schedule:
1. Contractor shall submit a complete glass schedule/location reference identifying all thicknesses, heat treatments, make-ups, and safety glazing designations in accordance with specifications and code requirements.
 2. Schedule to be submitted in conjunction with glass strength calculations.
- G. Inspection and Production Testing Programs:
1. Submit detailed description of inspection and production testing programs and inspection reports for:
 - a. Structural silicone glazing.
 - b. Organic coating of aluminum.
- H. Field Fix Documentation:
1. For remediation of field conditions that vary from the approved Shop Drawings and Calculations, submit Field Fix Documentation for review and approval by the Architect prior to implementation.
 2. The submitted document should include:
 - a. Documentation of the non-conforming conditions.
 - b. Proposed remediation with revised shop drawings, engineering calculations of the revised condition, new product data, etc., and all other relevant information required to clearly illustrate the proposed remediation.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals: Refer to Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer.

- C. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.
- D. Product Test Reports: For glazed aluminum curtain walls, for tests performed by a qualified testing agency.
 - 1. Test reports shall be submitted for approval prior to production or installation of any related component of the structural-sealant-glazed curtain wall.
 - 2. All test reports are subject to approval by the Architect and the Owner.
- E. Source quality-control reports.
- F. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.
- B. Maintenance Data for Structural Sealant: For structural-sealant-glazed curtain walls to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- C. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of curtain wall assemblies.

1.7 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings or, if not indicated, as directed by Architect.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 WARRANTY

- A. Special Assembly Warranty: Manufacturer agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

2. PRODUCTS

1.2 SUSTAINABLE DESIGN REQUIREMENTS

- A. Sustainable Design Requirements: Refer to Section 01 81 13 "Sustainable Design Requirements" for product requirements.

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage an Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazed aluminum curtain walls.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings and as indicated in RWDI Cladding Wind Load Study and RWDI Pedestrian Wind Comfort Study reports available from the Architect.
 - a. Where glazed aluminum curtain wall assemblies are exposed to the elements on both sides, they shall be engineer-designed to account for positive pressure acting on one side and negative pressure acting on the other side simultaneously.
2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to $1/240$ for spans up to 13 feet 6 inches; limited to $1/240$ plus $1/4$ inch for spans greater than 13 feet 6 inches.
2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than $1/8$ inch.
 - a. Operable Units: Provide a minimum $1/16$ -inch clearance between framing members and operable units.
3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
 - a. Perpendicular to Plane of Wall: No greater than $1/240$ of clear span plus $1/4$ -inch for spans greater than 11 feet 8- $1/4$ inches or $1/240$ times span, for spans less than 11 feet 8- $1/4$ inches.

E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
 1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft.
- H. Interstory Drift: Accommodate design displacement of adjacent stories indicated.
 1. Design Displacement: As indicated on Drawings.
 2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.
- I. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
 2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.
- J. Energy Performance: Certify and label energy performance according to NFRC as follows:
 1. Thermal Transmittance (U-factor): According to NFRC 100.
 - a. U-0.26 minimum value for fixed unit system
 - b. U-0.29 minimum value for operable unit system
 2. Solar Heat Gain Coefficient: According to NFRC 200.
 - a. .46 Solar Heat gain coefficient (SHGC) for typical window units
 - b. .56 Solar Heat Gain Coefficient (SHGC) for typical southern facing window units
 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.
- K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- L. Structural-Sealant Joints:
 1. Designed to produce tensile or shear stress of less than 20 psi.

- M. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed curtain walls without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Oldcastle BuildingEnvelope.
 2. Kawneer North America.
 3. Tubelite Inc.
 4. U.S. Aluminum.
 5. Wausau Window and Wall Systems; Apogee Wausau Group.
 6. YKK AP America Inc.
- B. Source Limitations: Obtain all components of curtain wall system, including framing spandrel panels, entrances, and accessories, from single manufacturer.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on two sides and structural sealant on two sides.
 3. Glazing Plane: Front.
 4. Finish: High-performance organic finish.
 5. Fabrication Method: Factory-fabricated system.
- B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
1. Provide mechanical attachment to retain exterior snap-on caps.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

- a. Sheet and Plate: ASTM B 209.
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
- a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCES

- A. Entrances: Comply with Section 08 41 13 "Aluminum-Framed Entrances and Storefronts."

2.5 GLAZING

- A. Glazing: Comply with Section 08 80 00 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
 - 1. Sealant shall have a VOC content of 250 g/L or less.
- D. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.
 - 1. Color: Black.
- E. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed curtain-wall manufacturers for this use.
 - 1. Color: Match structural sealant.

2.6 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.
 3. Where unavoidable, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch- thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Physical and thermal isolation of glazing from framing members.
 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Fabricate components to resist water penetration as follows:
1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
 2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.
- E. Curtain-Wall Framing: Fabricate components for assembly using manufacturer's standard assembly method.
- F. Factory-Assembled Frame Units:

1. Rigidly secure nonmovement joints.
 2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
 3. Preparation includes, but is not limited to, cleaning and priming surfaces.
 4. Seal joints watertight unless otherwise indicated.
 5. Install glazing to comply with requirements in Section 08 80 00 "Glazing."
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- H. Provide for intermittent stabilization anchors, secured to building slab edges, extending through vertical mullions where indicated or, if not indicated, as directed by Architect.
1. Assume intermittent stabilization anchors shall be provided at every 3 floors, but not more than 50 feet apart, whichever is less, unless otherwise indicated.

2.8 ALUMINUM FINISHES

- A. High-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color and clear coat.
1. Color and Gloss: Match Architect's sample.

2.9 SOURCE QUALITY CONTROL

- A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

3. EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

- A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 08 80 00 "Glazing."

1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

F. Install weatherseal sealant according to Section 07 92 00 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Test Area: Perform tests on one bay at least 30 feet, by two stories.
 - 1. Test area shall include one horizontal stack joint.
- C. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Typical and non-typical areas (such as corners) shall be tested for each wall type.
 - b. Wherever possible, test area shall incorporate interface conditions with adjacent curtain wall systems.
 - c. Interior side of test area shall be left open and unobstructed, permitting the full length of all joints to be examined from the indoor side.
 - d. At least three (3) "initially successful" water tests shall be performed at different stages of installation on each system.
 - 1) Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 - 2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
 - a. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 - 3. Water Penetration: ASTM E 1105 at a minimum uniform static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
- D. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
 - 1. Field Adhesion Testing of Sealants:
 - a. Field installed sealant joints shall be periodically tested to confirm the adhesion of the sealant to the substrate.
 - b. Perform ten tests for the first 1000 feet of joint length for each type of sealant and joint substrate.
 - c. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation for each type of sealant and joint substrate.
 - d. Tests shall be performed by the sealant manufacturer(s) whose product(s) are being supplied for the sealant joint(s).

- e. Testing shall comply with ASTM C1193, Test Method to Determine Sealant Adhesion Characteristics In-Situ.
- 2. Repair installation areas damaged by testing.
- E. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

END 08 44 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Aluminum windows for exterior locations.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

- B. Shop Drawings: For aluminum windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

- C. Samples: For each exposed product and for each color specified, 2 by 4 inches in size.

- D. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Qualification Data: For manufacturer and Installer.

- C. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranties: For manufacturer's warranties.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
- C. 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 mockup of typical wall area as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 - 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.
 - c. Aluminum Finish: 10 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

2.3 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: AAMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: LC.
 - 2. Minimum Performance Grade: 40.
- C. Thermal Transmittance (U-factor): According to NFRC 100.
 - 1. U-0.26 minimum value for fixed unit system
 - 2. U-0.29 minimum value for operable unit system
- D. Solar Heat Gain Coefficient: According to NFRC 200.
 - 1. .46 Solar Heat gain coefficient (SHGC) for typical window units
 - 2. .56 Solar Heat Gain Coefficient (SHGC) for typical southern facing window units
- E. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 45.
- F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.4 ALUMINUM WINDOWS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. EFCO Corporation.
 2. Graham Architectural Products Corporation.
 3. Kawneer North America, an Arconic company.
 4. Quaker Window Products, Inc.
 5. YKK AP America Inc.
- B. Types: Provide the following types in locations indicated on Drawings:
1. Projected, awning.
 2. Fixed.
- C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.
- D. Glass: Low-e insulating glass as specified in Section 08 80 00 "Glazing."
- E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Projected Window Hardware:
1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
 - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
 2. Hinges: Non-friction type, not less than two per sash.
 3. Lock: Lever handle and cam-action lock with keeper.
 4. Limit Devices: Concealed friction adjuster, adjustable stay bar or Concealed support arms with adjustable, limited, hold-open limit devices designed to restrict sash opening.
 - a. Limit clear opening to 4 inches for ventilation; with custodial key release.
- H. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 ACCESSORIES

- A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.
- B. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- C. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- D. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

2.6 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 1. Type and Location: Full, inside for projected, awning sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 2. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
 - a. Mesh Color: Manufacturer's standard.

2.7 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze aluminum windows in the factory.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color and clear coat.
 - 1. Color and Gloss: Match Architect's sample.

3. EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 - 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 - 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
 - 5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.

- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END 08 51 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Glazed aluminum window walls.
- B. Related Requirements:
 - 1. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for coordinating finish among aluminum fenestration units.

1.2 DEFINITIONS

- A. Window Wall: A non-load-bearing exterior wall assembly that is located inboard of floor slab edge and that extends (spans) from top of a floor slab assembly to bottom of floor slab assembly above. The assembly is not hung to the exterior of the building and does not bypass floor assemblies.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review and discuss the finishing of glazed aluminum window walls that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
 - 3. Review, discuss, and coordinate the interrelationship of glazed aluminum window walls with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
 - 4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 - 5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes.
- B. Shop Drawings: For glazed aluminum window walls.
 - 1. Include plans, elevations, sections, hardware, accessories, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

2. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- D. Samples for Initial Selection: For units with factory-applied finishes.
1. Include Samples of hardware and accessories involving color selection.
- E. Samples for Verification: For glazed aluminum window walls and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
1. Exposed Finishes: 2 by 4 inches.
 2. Exposed Hardware: Full-size units.
- F. Delegated-Design Submittal: For glazed aluminum window walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the Illinois licensed Structural Engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer and field testing agency.
- C. Energy Performance Certificates: For glazed aluminum window walls, accessories, and components from manufacturer.
1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum window wall.
- D. Product Test Reports: For glazed aluminum window walls, for tests performed by a qualified testing agency.
- E. Field quality-control reports.
- F. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For glazed aluminum window walls to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for installation of their products; who has successfully completed projects similar in material, detail, and extent to that required for Project, on not less than five

projects, to satisfaction of Architect; and whose work has resulted in construction with a record of successful in-service performance for not less than 10 years.

- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- 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 mockup of typical window assemblies as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace glazed aluminum window walls that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including, but not limited to, excessive deflection.
 - c. Faulty operation of operable components and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Water penetration through framing areas.
 - f. Air infiltration through framing areas.
 - g. Failure of insulating glass.
 - 2. Warranty Period: 5 years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage an Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazed aluminum window walls.
- B. Performance, General: Comply with performance requirements specified, as determined by testing of glazed aluminum window walls representing those indicated for the Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 1. Glazed aluminum window walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Glazed aluminum window walls and their anchorages, and related components, shall be designed with adequate strength and stiffness to withstand design loads, both positive and negative.
 3. Failure includes, but is not limited to, the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Penetration of water into the building.
 - f. Air infiltration exceeding specified limits.
 - g. Failure of operating units.
- C. Structural Loads: The glazed aluminum window walls, including glazing, shall be designed, fabricated, and installed to withstand the following:
 1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
 3. Impact Loads (Due to Building Occupants):
 - a. Concentrated load of 200 lbf applied in any direction, at any point.
 - b. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft. This load need not be assumed to act concurrently with the concentrated load in the preceding paragraph.
 4. Building Corners: Elements at building corners shall be investigated for the following, with the more conservative utilized for design:

- a. Simultaneous positive design pressures on both sides of the corner.
 - b. Simultaneous negative design pressures on both sides of the corner.
 - c. Positive design pressures on one side of the corner and negative design pressures on the other side of the corner, occurring simultaneously.
- 5. Window Cleaning Equipment Loads: Loads due to window cleaning equipment shall be considered in the design of the glazed aluminum window walls.
 - a. Design Load: Each anchor shall be capable of sustaining a load of not less than 600 pounds applied in any direction.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- E. Structural: Test according to ASTM E 330 as follows:
 - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.1 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
 - 1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
 - 1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 12 lbf/sq. ft.
- H. Energy Performance: Certify and label energy performance according to NFRC as follows:
 - 1. Thermal Transmittance (U-factor): According to NFRC 100.

- a. U-0.26 minimum value for fixed unit system
 - b. U-0.29 minimum value for operable unit system
- 2. Solar Heat Gain Coefficient: According to NFRC 200.
 - a. .46 Solar Heat gain coefficient (SHGC) for typical window units
 - b. .56 Solar Heat Gain Coefficient (SHGC) for typical southern facing window units
- 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 58 as determined according to NFRC 500.
- I. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 130 deg F ambient; 180 deg F material surfaces.

2.3 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Kawneer North America; an Alcoa company.
 - 2. Oldcastle BuildingEnvelope™.
 - 3. Tubelite Inc.
 - 4. U.S. Aluminum; a brand of C.R. Laurence.
 - 5. YKK AP America Inc.
- B. Source Limitations: Obtain all glazed aluminum window wall system components, including sun control and accessories, from single source.

2.4 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Construction: Thermally broken.
 - 2. Glazing System: Retained mechanically with gaskets on four sides.
 - 3. Glazing Plane: Front.
 - 4. Finish: High-performance organic finish.
 - 5. Fabrication Method: Either factory- or field-fabricated system.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

- a. Sheet and Plate: ASTM B 209.
- b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- d. Structural Profiles: ASTM B 308/B 308M.

2.5 ENTRANCES

- A. Entrances: Comply with Section 08 41 13 "Aluminum-Framed Entrances and Storefronts."

2.6 SUN CONTROL

- A. Sunshades: Assemblies consisting of manufacturer's standard outrigger brackets, louvers, and fascia, designed for attachment to curtain wall with mechanical fasteners.
 - 1. Orientation: Horizontal and Vertical.
 - 2. Projection from Wall: As indicated on Drawings.
 - 3. Outriggers: As indicated on Drawings, or if not indicated, as directed by Architect.
 - 4. Louvers: As indicated on Drawings.
 - 5. Fasciae: As indicated on Drawings.
 - 6. Finish: Match adjacent glazed aluminum curtain wall, unless directed otherwise by Architect.
 - 7. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 8. Steel Reinforcement: As required by manufacturer.

2.7 GLAZING

- A. Glazing: As specified in Section 08 80 00 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- C. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings. Provide extended subsills as required to effectively manage infiltrating water.

- D. Head Receptors: Thermally broken, extruded-aluminum head receptors in configurations indicated on Drawings. Provide extended/monumental head receptors as required to accommodate vertical displacement of building structure, including live load deflections.
- E. Slab Edge Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- F. Exterior Trim (Panning): Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- G. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- H. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from interior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Fabricate components to resist water penetration as follows:
 - 1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum window wall to exterior.
- E. Weather strip each operable sash to provide weathertight installation.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. High-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color and clear coat.
 - 1. Color and Gloss: Match Architect's sample.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 - 6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
 - 7. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum window wall to exterior.
- D. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

- E. Install glazing as specified in Section 08 80 00 "Glazing."

3.3 ERECTION TOLERANCES

- A. Erection Tolerances: Install glazed aluminum window walls to comply with the following maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet.
 - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Extent: Tests shall be performed on the following:
 - 1. Window wall mockups.
- C. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of window walls for air infiltration and water resistance shall be performed according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: The applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 - 3. Water-Resistance Testing:
 - a. Test Pressure: Test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 - 4. Test Reports: Prepared according to AAMA 502.

- D. Glazed aluminum window walls will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.5 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean exposed surfaces immediately after installation. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Protect surfaces of glazed aluminum window walls from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window wall surfaces, remove contaminants immediately according to manufacturer's written instructions.

END 08 51 14.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Glass for windows, doors, storefront framing, curtain wall and window wall.
 - 2. Glazing sealants and accessories.
- B. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements."

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer, manufacturers of insulating-glass units with sputter-coated, low-E coatings glass, and testing agency.
- C. Product Certificates: For glass.
- D. Product Test Reports: For coated glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.
- E. Preconstruction adhesion and compatibility test report.
- F. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" to match glazing systems required for Project, including glazing methods.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.10 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.3 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
 - 1. Design Wind Pressures: As indicated on Drawings.
 - 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 - 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 - 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 - 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.4 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.5 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
 - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 - 2. Spacer: Manufacturer's standard spacer material and construction.
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

3. EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END 08 80 00.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Film-backed glass mirrors qualifying as safety glazing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.
- C. Samples: For each type of the following:
 - 1. Mirrors: 12 inchesquare, including edge treatment on two adjoining edges.
 - 2. Mirror Clips: Full size.
 - 3. Mirror Trim: 12 incheslong.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Preconstruction test report.
- C. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Guardian Glass; SunGuard.
 2. Lenoir Mirror Company.
 3. Walker Glass Co., Ltd.

2.3 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C1503.
- B. Annealed Monolithic Glass Mirrors: Mirror Select Quality, clear.
 1. Nominal Thickness: 6.0 mm.
- C. Safety Glazing Products: For film-backed mirrors, provide products that comply with 16 CFR 1201, Category II.

2.4 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating approved by mirror manufacturer.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors.
- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.5 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.

1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
 2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.
 3. Finish: Clear bright anodized.
- B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

2.6 FABRICATION

- A. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- B. Mirror Edge Treatment: Flat polished. Seal edges of mirrors with edge sealer.
- C. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- B. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
1. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.

- C. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END 08 83 00.

DIVISION 09 -FINISHES
Section 09 21 16.23 - Gypsum Board Shaft Wall Assemblies

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Gypsum board shaft wall assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data: For each component of gypsum board shaft wall assembly.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E90 and classified according to ASTM E413 by a testing and inspecting agency.
- C. Load Resistance and Deflection Criteria:
1. Engineer gypsum board shaft wall assemblies to withstand the following lateral design loads without failing and while maintaining an air- and smoke-tight seal.
 2. Loads shall be applied cyclically under in-service conditions for maximum heights of partitions indicated.
 3. Evidence of failure includes deflections exceeding those indicated, bending stresses causing framing to break or to distort, or end reaction shear forces causing runners to bend or shear, or studs to become crippled.
 - a. Design Lateral Load: 10 psf.
 - b. Deflection Criteria:

- 1) Typical Walls: Shaft wall assemblies shall be constructed so deflection does not exceed 1/240 of the wall height when subjected to load indicated, both positive and negative.

2.3 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire-Resistance Rating: As indicated .
- B. STC Rating: As indicated .
- C. Gypsum Shaftliner Board:
 1. Type X: ASTM C1396/C1396M; manufacturer's proprietary fire-resistive liner panels with paper faces, 1 inch thick, with double beveled long edges.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Georgia-Pacific Gypsum LLC.
 - 2) National Gypsum Company.
 - 3) USG Corporation.
 2. Moisture- and Mold-Resistant Type X: ASTM C1396/C1396M; manufacturer's proprietary fire-resistive liner panels with ASTM D3273 mold-resistance score of 10 as rated according to ASTM D3274, 1 inch thick, and with double beveled long edges.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Georgia-Pacific Gypsum LLC.
 - 2) National Gypsum Company.
 - 3) USG Corporation.
- D. Non-Load-Bearing Steel Framing, General: Complying with ASTM C645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.
- E. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:
 1. Depth: As indicated .
 2. Minimum Base-Metal Thickness: As required for load resistance and deflection criteria .
- F. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.
 1. Minimum Base-Metal Thickness: As required for load resistance and deflection criteria .
- G. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly

indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

- H. Finish Panels: Gypsum board as specified in Section 09 29 00 "Gypsum Board." .
- I. Sound Attenuation Blankets: As specified in Section 09 29 00 "Gypsum Board."

2.4 AUXILIARY MATERIALS

- A. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 09 29 00 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
- C. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
- D. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch minimum thickness of base metal (uncoated).
- E. Acoustical Sealant: Section 07 92 19 "Acoustical Joint Sealants."

3. EXECUTION

3.1 INSTALLATION

- A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
 - 1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
 - 2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.
- D. Penetrations: Install supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.
- E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.

- F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- G. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
- H. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
- I. 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.
- J. Remove and replace panels that are wet, moisture damaged, or mold damaged.

END 09 21 16.23.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 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 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Product Certificates: For each type of code-compliance certification for studs and tracks.
- C. Evaluation reports for embossed, high-strength steel studs and tracks, firestop tracks, post-installed anchors, and power-actuated fasteners.

1.4 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.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.3 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
 - 2. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C645. 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. ClarkDietrich.
 - b. MarinoWARE.
 - c. SCAFCO Steel Stud Company.
 - d. The Steel Network, Inc.
 - 2. Minimum Base-Steel Thickness: 0.0179 inch.
 - 3. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
 - 1. Single Long-Leg Track System: ASTM C645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 - 2. Double-Track System: ASTM C645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 - 3. 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) MarinoWARE.
 - 4) SCAFCO Steel Stud Company.
 - 5) The Steel Network, Inc.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. CEMCO; California Expanded Metal Products Co.
 - b. ClarkDietrich.
 - c. Fire Trak Corp.
 - d. MarinoWARE.
 - e. SCAFCO Steel Stud Company.
 - f. The Steel Network, Inc.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. Minimum Base-Steel Thickness: 0.0179 inch.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: As indicated on Drawings.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C645.
 - 1. Minimum Base-Steel Thickness: 0.0179 inch.
 - 2. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
 - 1. Configuration: Asymmetrical or hat shaped.
- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: As indicated on Drawings.
 - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
 - 3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- J. 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.

2.4 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Wire Hangers: ASTM A641/A641M, 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: 2-1/2 inches.

D. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks: ASTM C645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
 - a. Minimum Base-Steel Thickness: 0.0179 inch.
 - b. Depth: As indicated on Drawings.
3. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.
 - a. Minimum Base-Steel Thickness: 0.0179 inch.
4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.

2.5 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.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

3. EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 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.

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. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks 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.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:
 - 1. Erect insulation, specified in Section 07 21 00 "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.
- G. 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 permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

- E. 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 09 22 16.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each texture finish indicated on same backing indicated for Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.

- b. CertainTeed Corporation.
- c. Georgia-Pacific Gypsum LLC.
- d. National Gypsum Company.
- e. USG Corporation.

2.4 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch or as indicated.
 - 2. Long Edges: Tapered.
- B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Thickness: 1/2 inch.
 - 2. Long Edges: Tapered.
- C. Mold-and-Moisture Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Thickness: 5/8 inch or as indicated.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
 - 1. Core: 5/8 inch, Type X.
 - 2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
 - 1. Thickness: 1/2 inch.
 - 2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Rigid PVC, mud set beads.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. Types: As detailed or as required for finished appearance.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 - 2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- D. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

- E. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

3. EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C 840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
 - 4. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
- H. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- I. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END 09 29 00.

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Quarry tile.
2. Porcelain tile.
3. Glazed wall tile.
4. Waterproof membrane for thinset applications.
5. Crack isolation membrane.
6. Metal edge strips.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.
3. Stone thresholds.

1.3 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

B. Qualification Data: For Installer.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A single firm that specializes in the installation of ceramic tiling; that has successfully completed installations similar in material, design, and extent to that required for Project, on not less than three projects of similar scope, to the satisfaction of Architect; and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years.

- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of each type of floor tile installation.
 - 2. Build mockup of each type of wall tile installation.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.3 TILE PRODUCTS

- A. Tile Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.

2.4 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; REdGard Waterproofing and Crack Prevention Membrane.
 - b. H.B. Fuller Construction Products Inc. / TEC; HydraFlex - Waterproofing Crack Insulation Membrane.
 - c. LATICRETE SUPERCAP, LLC; Laticrete Hydro Ban.
 - d. MAPEI Corporation; Mapelastic™ AquaDefense.

2.5 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; RedGard Waterproofing and Crack Prevention Membrane.
 - b. H.B. Fuller Construction Products Inc. / TEC; HydraFlex - Waterproofing Crack Insulation Membrane.
 - c. LATICRETE SUPERCAP, LLC; Latricete Hydro Ban.
 - d. MAPEI Corporation; Mapelastic™ AquaDefense.

2.6 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. LATICRETE SUPERCAP, LLC.
 - d. MAPEI Corporation.
 - 2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 - 3. For wall applications, provide nonsagging mortar.
- B. Medium-Bed, Modified Dry-Set Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. LATICRETE SUPERCAP, LLC.
 - d. MAPEI Corporation.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
- C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Custom Building Products.
- b. H.B. Fuller Construction Products Inc. / TEC.
- c. LATICRETE SUPERCAP, LLC.
- d. MAPEI Corporation.

2.7 GROUT MATERIALS

- A. High-Performance Tile Grout: ANSI A118.7.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. LATICRETE SUPERCAP, LLC.
 - d. MAPEI Corporation.
 - 2. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. LATICRETE SUPERCAP, LLC.
 - d. MAPEI Corporation.

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; exposed-edge material as selected by Architect.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- C. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors in laundries.
 - c. Tile floors consisting of tiles 8 by 8 inches or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Quarry Tile: As indicated, or if not indicated as directed by Architect.
 - 2. Glazed Wall Tile: As indicated, or if not indicated as directed by Architect.
 - 3. Porcelain Tile: As indicated, or if not indicated as directed by Architect.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- L. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- M. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- N. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

3.4 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F122; thinset mortar on waterproof membrane.
 - a. Thinset Mortar: Improved modified dry-set mortar.
 - b. Grout: Epoxy grout at restroom and high traffic floors and High-performance sanded grout in all other locations.
2. Ceramic Tile Installation: TCNA F125-Full; thinset mortar on crack isolation membrane.
 - a. Thinset Mortar: Improved modified dry-set mortar.
 - b. Grout: Epoxy grout at restroom and high traffic floors and High-performance sanded grout in all other locations.
3. Ceramic Tile Installation: TCNA F131; water-cleanable, tile-setting epoxy; epoxy grout.
 - a. Grout: Water-cleanable epoxy grout.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.
 - a. Thinset Mortar: Improved modified dry-set mortar.
 - b. Grout: High-performance unsanded grout.
2. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Thinset Mortar: Improved modified dry-set mortar.
 - b. Grout: High-performance unsanded grout.

C. Bathtub/Shower Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA B412; thinset mortar on cementitious backer units or fiber-cement backer board.
 - a. Thinset Mortar: Improved modified dry-set mortar.
 - b. Grout: High-performance unsanded grout.

D. Shower Receptor and Wall Installations:

1. Ceramic Tile Installation: TCNA B414 and ANSI A108.1C; cement mortar bed (thickset) over vapor-retarder membrane.
 - a. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - b. Grout: Water-cleanable epoxy grout.
2. Ceramic Tile Installation: TCNA B420; thinset mortar on waterproof membrane over coated glass-mat, water-resistant gypsum backer board.

- a. Thinset Mortar: Improved modified dry-set mortar.
- b. Grout: High-performance unsanded grout.

END 09 30 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- C. Product test reports.
- D. Research reports.
- E. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E1264.
 - 2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL PANELS

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
- C. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E1264.
- D. Color: As selected by Architect from manufacturer's full range.
- E. Edge/Joint Detail: As selected by Architect from manufacturer's full range.
- F. Thickness: As selected by Architect from manufacturer's full range.
- G. Modular Size: As indicated on Drawings.

2.4 METAL SUSPENSION SYSTEM

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

3. EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - 4. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform inspections.
 - 1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

END 09 51 13.

DIVISION 09 -FINISHES
Section 09 65 13 - Resilient Base and Accessories

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following::

1. Rubber base.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 THERMOSET-RUBBER BASE

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
- B. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
1. Group: I (solid, homogeneous).
 2. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.
 - c. Style C, Molded: Provide in areas indicated.
- C. Thickness: 0.125 inch.
- D. Height: As indicated.
- E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.

- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors: As indicated.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

3. EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END 09 65 13.

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following::

1. Solid vinyl (LVT) floor tile.
2. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and pattern specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.3 SOLID VINYL FLOOR TILE

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
 - 1. 20mm wear layer and attached acoustic underlayment
 - 2. Cool Floor 3rd party verified
 - 3. 100% recyclable
 - 4. Materials that contain no ortho-phthalate plasticizers, heavy metal ingredients, and added formaldehyde.
 - 5. Adhesive to be CRI Green Label Plus Approved and CA 01350 requirements.
- B. Tile Standard: ASTM F1700.
 - 1. Class: Class II, Surface-Decorated Vinyl Tile or Class III, Printed Film Vinyl Tile.
 - 2. Type: B, Embossed Surface.
- C. Colors and Patterns: As indicated by manufacturer's designations.

2.4 VINYL COMPOSITION FLOOR TILE

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
- B. Tile Standard: ASTM F1066, Class 2, through pattern.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch.
- E. Size: As indicated on Drawings.
- F. Colors and Patterns: Match Architect's samples.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

3. EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

END 09 65 19.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Resinous flooring systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of exposed finish required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Material certificates.
- C. Material test reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing according to ASTM D635.

2.3 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation.
 - b. Crossfield Products Corp.
 - c. DUDICK Inc.
 - d. Sherwin-Williams Company, General Polymers.
 - e. Sika Corporation; Flooring.
 - f. Stonhard, Inc.

3. EXECUTION

3.1 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 - 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C811 requirements unless manufacturer's written instructions are more stringent.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
 - b. Plastic Sheet Test: ASTM D4263. Proceed with application only after testing indicates absence of moisture in substrates.
 - c. Relative Humidity Test: Use in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

- A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.
- D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions. Round internal and external corners.
1. Integral Cove Base: 4 inches high.
- E. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness indicated for flooring system.
1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- F. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- G. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.

- H. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.
- I. Protect resinous flooring from damage and wear during the remainder of construction period.

END 09 67 23.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following::

1. Modular carpet tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

- C. Samples: For each exposed product and for each color and texture required.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.5 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 CARPET TILE

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
 - 1. Tufted.
 - 2. 100% solution dyed fiber.
 - 3. Recycled content fiber with modification ration equal to or less than 2.2
 - 4. 3rd party certified carbon neutral manufacturer.
 - 5. 3rd party certified closed loop recycling program that eliminates landfill waste and waste to energy outcomes.
- B. Color: As indicated.
- C. Pattern: As indicated.
- D. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- E. Secondary Backing: Manufacturer's standard material.
- F. Size: As indicated.
- G. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- H. Performance Characteristics:
 - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D7330.
 - 2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
 - 3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D2646.
 - 4. Tuft Bind: Not less than 3 lbf according to ASTM D1335.
 - 5. Delamination: Not less than 3.5 lbf/in. according to ASTM D3936.
 - 6. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
 - 7. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
 - 8. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.

9. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
10. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

3. EXECUTION

3.1 EXAMINATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.2 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END 09 68 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Broadloom carpet.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For carpet installation, showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Pattern type, repeat size, location, direction, and starting point.
8. Pile direction.
9. Types, colors, and locations of insets and borders.
10. Types, colors, and locations of edge, transition, and other accessory strips.
11. Transition details to other flooring materials.

- C. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

- B. Product test reports.

- C. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A single firm that specializes in the installation of sheet carpeting; that has successfully completed installations similar in material, design, and extent to that required for Project, on not less than three projects of similar scope, to the satisfaction of Architect; and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years.

1.7 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 BROADLOOM CARPET

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
 - 1. Tufted.
 - 2. 100% solution dyed fiber.
 - 3. Recycled content fiber with modification ration equal to or less than 2.2
 - 4. 3rd party certified carbon neutral manufacturer.
 - 5. 3rd party certified closed loop recycling program that eliminates landfill waste and waste to energy outcomes.
- B. Color: As indicated by manufacturer's designations.
- C. Primary Backing: Manufacturer's standard material.
- D. Secondary Backing: Manufacturer's standard material.
- E. Roll Width: 12 feet.
- F. Applied Treatments:
 - 1. Applied Soil-Resistance Treatment: Manufacturer's standard material.
 - 2. Antimicrobial Treatment: Manufacturer's standard material.

- a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

G. Performance Characteristics:

1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
2. Dry Breaking Strength: Not less than 100 lbf according to ASTM D2646.
3. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
- C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

3. EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:
 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet manufacturer's written installation instructions for preparing substrates.

- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

- A. Comply with the Carpet and Rug Institute's CRI 104 and carpet manufacturer's written installation instructions for the following:
 - 1. Direct-glue-down installation.
- B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Install pattern parallel to walls and borders.
- D. Install borders with mitered corner seams.
- E. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- F. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END 09 68 16.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following::

1. Vinyl wall covering.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch- long in size.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Product test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- a. Flame-Spread Index: 25 or less.
- b. Smoke-Developed Index: 50 or less.

2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265 or NFPA 286.

2.3 VINYL WALL COVERING

- A. Products: To be selected in a future issuance. Refer to the Space Needs Inventories in Volume 3 for additional information.
 1. VWC2 (Type 2 wallcovering)
 - a. PVC-free
 - b. Materials sourced from rapidly renewable sources in lieu of fossil fuels
 - c. High performance third party certified type 2 wallcovering that is cleanable, durable, colorfast, and with anti-microbial properties.
 - d. Tear and abrasion resistant
 2. VWC3 (Type 3 wall protection)
 - a. High performance type 3 wall protection that is stain resistant, scuff resistant, bacteria and fungal resistant
 - b. Impact and abrasion resistant
- B. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

2.4 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.
- C. Metal Primer: Interior ferrous metal primer complying with Section 09 91 23 "Interior Painting" and recommended in writing by primer and wall-covering manufacturers for intended substrate.

3. EXECUTION

3.1 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 4. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.2 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern 72 inches above the finish floor.
- F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- I. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- J. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END 09 72 00.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Shop-fabricated, fabric-wrapped wall panels.
- B. Related Sections:
 - 1. Section 09 72 00 "Wall Coverings" for adhesively applied textile wall coverings.

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. Include fabric facing, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For panel assembly and installation.
 - 1. Include plans, elevations, sections, and mounting devices and details.
 - 2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
 - 3. Include details at cutouts and penetrations for other work.
 - 4. Include direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing.
 - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For the following products:
 - 1. Fabric: Full-width by approximately 36-inch- long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
 - 2. Panel Edge: 12-inch-long Sample(s) showing each edge profile, corner, and finish.
 - 3. Core Material: 12-inch-square Sample at corner.
 - 4. Mounting Devices: Full-size Samples.
 - 5. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Electrical outlets, switches, and thermostats.
 - 2. Items penetrating or covered by panels including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Alarms.
 - e. Sprinklers.
 - f. Access panels.
 - 3. Show operation of hinged and sliding components covered by or adjacent to panels.
- C. Product Certificates: For each type of panel.
- D. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of panel to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 sq. yd., full width of bolt.
 - 2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.
 - 1. Build mockup of typical wall area 48 inches wide by full height.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install panels until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install panels until a permanent level of lighting is provided on surfaces to receive the panels.
- C. Air-Quality Limitations: Protect panels from exposure to airborne odors such as tobacco smoke, and install panels under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify panel locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace panels and components that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Fabric sagging, distorting, or releasing from panel edge.
 - b. Warping of core.
 2. Warranty Period: Two years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations: Obtain fabric-wrapped wall panels from single source from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Panels shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.4 FABRIC-WRAPPED WALL PANELS

- A. Fabric-Wrapped Wall Panel: Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conwed Designscape; an Owens Corning company.
 - b. Decoustics Limited; a Saint Gobain company.
 - c. Golterman & Sabo.
 - 2. Panel Shape: As indicated on Drawings.
 - 3. Mounting: Back mounted with manufacturer's standard metal clips or bar hangers, secured to substrate.
 - 4. Core: Manufacturer's standard.
 - 5. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
 - 6. Corner Detail in Elevation: As indicated on Drawings, with continuous edge profile indicated. with continuous edge profile indicated.
 - 7. Reveals between Panels: As selected by Architect from manufacturer's full range.
 - 8. Facing Material: As indicated on Drawings.
 - 9. Nominal Overall Panel Thickness: As indicated on Drawings.
 - 10. Panel Width: As indicated on Drawings.
 - 11. Panel Height: As indicated on Drawings.

2.5 MATERIALS

- A. Core Materials: Manufacturer's standard.
- B. Facing Material: COM.
- C. Mounting Devices: Concealed on back of panel, recommended by manufacturer to support weight of panel, and as follows:
 - 1. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of panel and the other part to substrate, designed to permit unit removal.

2.6 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Edge Hardening: For glass-fiber board and mineral-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.
- C. Facing Material and Lining Material: Apply fabric fully covering visible surfaces of panel; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
 - 1. Square Corners: Tailor corners. Heat-seal vinyl fabric seams at corners.
 - 2. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent panels.
- D. Dimensional Tolerances of Finished Panels: Plus or minus 1/16 inch for the following:
 - 1. Thickness.
 - 2. Edge straightness.
 - 3. Overall length and width.
 - 4. Squareness from corner to corner.

3. EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated panels, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting panel performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install panels in locations indicated. Unless otherwise indicated, install panels with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of panels using type of mounting devices indicated. Mount panels securely to supporting substrate.
- C. Align fabric pattern and grain as indicated on Drawings.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.
- B. Variation of Joint Width: Not more than 1/16 inch wide from hairline in 48 inches, noncumulative.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END 09 77 23.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Surface preparation and the application of paint systems on the following exterior substrates:
 - a. Galvanized metal
 - b. Steel

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Behr Process Corporation (Behr).
 - 2. Benjamin Moore & Co. (BM).
 - 3. PPG Industries, Inc. (PPG).
 - 4. Sherwin-Williams Co. (The) (S-W).
 - 5. Tnemec.
- B. Products: Subject to compliance with requirements, provide one of the products listed in the Exterior Painting Schedule for the paint category indicated.

2.3 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: Match Architect's samples.

2.4 EXTERIOR PAINTING SCHEDULE

A. Steel and Iron Substrates:

1. Alkyd System:

a. Prime Coat: Primer, alkyd, anticorrosive, for metal.

- 1) BEHR: Kilz Complete Oil-Based Primer
- 2) BM: Super Spec Alkyd Metal Primer P06.
- 3) PPG: Devguard 4360 Rust Inhibitive Primer.
- 4) S-W: Kem Bond HS, B50 Series.
- 5) Tnemec: Series 10 Tnemec Primers.

b. Topcoat: Alkyd, exterior, semi-gloss (MPI Gloss Level 5).

- 1) BEHR: Int/Ext Oil-Based Semi-Gloss Enamel 3800
- 2) BM: Super Spec HP Alkyd Semi-Gloss Enamel P24.
- 3) PPG: Devguard 4306 Alkyd Semi-Gloss Enamel.
- 4) S-W: Metalastic DTM, B55 Series.
- 5) Tnemec: Series 82HS Versatone.

B. Galvanized-Metal Substrates:

1. Latex System:

a. Prime Coat: Primer, galvanized, water based.

- 1) Behr: Behr Premium Plus Int/Ext Multi-Surface Primer & Sealer 436.
- 2) BM: Ultra Spec DTM Acrylic Semi-Gloss Enamel HP29.
- 3) PPG: 90-912 Pitt Tech Plus 100% Acrylic DTM Primer.
- 4) S-W: Pro Industrial ProCryl WB Metal Primer, B66-310 Series.
- 5) Tnemec: Series 115 Uni-bond DF

b. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5).

- 1) Behr: Behr Direct To Metal Semi-Gloss Enamel 3200.
- 2) BM: Ultra Spec DTM Acrylic Semi-Gloss Enamel HP29.
- 3) PPG: 6-900XI Speedhide Exterior Semi-Gloss.
- 4) S-W: Pro Industrial Acrylic Semi-Gloss, B66-651 Series.
- 5) Tnemec: Series 115 Uni-bond DF.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance of paint materials with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END 09 91 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Surface preparation and the application of paint systems on the following interior substrates:
 - a. Concrete masonry units (CMU).
 - b. Steel.
 - c. Galvanized metal.
 - d. Wood.
 - e. Gypsum board.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Include color designations.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Behr Process Corporation (Behr).
 - 2. Benjamin Moore & Co. (BM).
 - 3. PPG Paints (PPG).
 - 4. Sherwin-Williams Company (The) (S-W).
 - 5. Tnemec.

2.3 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 - 1. Flat Paints and Coatings: 50 g/L.

2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

- C. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Colors: Match Architect's samples.

2.4 INTERIOR PAINTING SCHEDULE

A. Products, General:

1. Meets Green Guard Gold Certification/meets LEED v4
2. Anti Microbial properties
3. Acrylic Latex
4. Washable
5. Stain Resistance

B. CMU Substrates:

1. Dry Environments:

a. One (1) coat, latex block filler:

- 1) Behr: Behr Pro Block Filler Primer 50 (50 g/L)
- 2) BM: 206 Super Spec Acrylic Latex Block Filler (45 g/L)
- 3) PPG: 6-7 SpeedHide Interior/Exterior Masonry Latex Block Filler (28 g/L VOC).
- 4) S-W: Preprite Latex Block Filler, B25W25 (<50 g/L VOC).
- 5) Tnemec: Series 130 Envirofill (71 g/L)

b. Two (2) coats, acrylic-latex enamel (eggshell):

- 1) Behr: Behr Pro i300 Interior Eggshell Paint 330 (5 g/L)
- 2) BM: N538 Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (0g/L)
- 3) PPG: Speedhide Zero VOC 6-4310XI (< 50 g/L VOC).
- 4) S-W: ProMar 200 Zero VOC Interior Latex EgShel, B20W2600 (<50 g/L VOC).
- 5) Tnemec: Series 1026 Enduratone (48 g/L)

2. Wet Environments:

a. One (1) coat, epoxy block filler:

- 1) Behr: Behr Pro Block Filler Primer 50 (50 g/L)
- 2) BM: Corotech V163 Waterborne Epoxy Block Filler (<85g/L)
- 3) PPG: Amerlock Epoxy Block Filler 400 BF (98 g/L VOC).
- 4) S-W: Heavy Duty Block Filler, B42W46 (< 100 g/L VOC).
- 5) Tnemec: Series 215 Surfacing Epoxy (0 g/L)

b. Two (2) coats, epoxy finish (Wet Environments):

- 1) Behr: Behr: Monochem Epoxyguard Enamel Pre-Catalyzed Waterbased Epoxy Eggshell 3950 (2 g/L) or Semi-Gloss 4050 (2 g/L)
- 2) BM: Corotech Pre-Catalyzed Waterborne Epoxy V341 Semi-Gloss or V342 Eggshell (< 70 g/L VOC).
- 3) PPG: Pitt-Glaze WB1 Pre-Catalyzed Epoxy Eggshell (93 g/L VOC).
- 4) S-W: Pro Industrial WB Catalyzed Interior Gloss or EgShel, B73 Series (< 50 g/L VOC).
- 5) Tnemec: Series 287 Enviro-pox (6 g/L).

C. Gypsum Board Substrate:

1. Walls:

a. One (1) coat, latex primer:

- 1) Behr: Behr Premium Plus Interior Drywall Primer & Sealer 73 (50 g/L)
- 2) BM: N534 Ultra Spec 500 Interior Latex Primer (0 g/L)
- 3) PPG: 6-4900XI Speedhide Zero VOC Primer (< 50 g/L VOC).
- 4) S-W: ProMar 200 Zero VOC Interior Latex Primer, B28W2600 (< 50 g/L VOC).
- 5) Tnemec: Series 1026 Enduratone (48 g/L).

b. Two (2) coats, -acrylic-latex enamel (eggshell):

- 1) Behr: Behr Pro i300 Interior Eggshell Paint 330 (5 g/L)
- 2) BM: N538 Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (0g/L)
- 3) PPG: 6-4310XI Speedhide Zero VOC Eggshell(< 50 g/L VOC).
- 4) S-W: ProMar 200 Zero VOC Interior Latex EgShel, B20W2600 (< 50 g/L VOC).
- 5) Tnemec: Series 1026 Enduratone (48 g/L).

2. Ceilings:

a. One (1) coat, latex primer:

- 1) Behr: Behr Premium Plus Interior Drywall Primer & Sealer 73 (50 g/L)
- 2) BM: Coronado 40 Super Kote 5000 Acrylic Latex Primer (<50g/L) or Super Hide Zero VOC Interior Latex Primer 354 (0g/L)
- 3) PPG: 6-4900XI Speedhide Zero VOC Primer(< 50 g/L VOC).
- 4) S-W: ProMar 400 Zero VOC Interior Primer, B28W4600 (< 50 g/L VOC).
- 5) Tnemec: Series 1026 Enduratone (48 g/L).

b. Two (2) coats, Acrylic-Latex (flat):

- 1) Behr: Behr Pro i300 Interior Flat Paint 310 (5 g/L)
- 2) BM: Coronado 88 Super Kote 1000 Latex Flat (<50g/L) or Super Hide Zero VOC Interior Flat 355 (0g/L)
- 3) PPG: 6-4110XI Speedhide Zero VOC Flat (0g/L).
- 4) S-W: ProMar 400 Zero VOC Interior Latex Flat, B30-4600 (< 50 g/L).
- 5) Tnemec: Series 1026 Enduratone (48 g/L).

D. Steel Substrate:

1. Hollow Metal Doors and Frames:

a. One (1) coat, water based primer:

- 1) Behr: Behr Premium Plus Int/Ext Multi-Surface Primer & Sealer 436 (50 g/L)
- 2) BM: 0790 Advance Waterborne Interior Primer (44g/L VOC)
- 3) PPG: 90-712 Pitt-Tech Interior/Exterior DTM Industrial Primer/Finish (123 g/L VOC).
- 4) S-W: Pro Industrial Pro-Cryl Universal Primer, B66-310 (< 100 g/L).
- 5) Tnemec: Series 27WB Typoxy, waterbased (6.6 g/L)

b. Two (2) coats, alkyd/oil eggshell enamel:

- 1) Behr: Behr Int/Ext Alkyd Semi-Gloss Enamel 3900 (50 g/L)
- 2) BM: 0792 Advance Waterborne Interior Satin (48g/L)
- 3) PPG: 6-1410 SpeedHide Interior/Exterior WB Alkyd Satin (36 g/L VOC).
- 4) S-W: ProMar 200 Interior WB Acrylic-Alkyd EgShel, B33-8200 (< 100 g/L VOC).
- 5) Tnemec: Series 1026 Enduratone (48 g/L).

2. Handrails

a. One (1) coat, water based primer:

- 1) Behr: Behr Premium Plus Int/Ext Multi-Surface Primer & Sealer 436 (50 g/L)
- 2) BM: Corotech V341Pre-Catalyzed Waterborne Epoxy Semi-Gloss (< 70 g/L VOC).
- 3) PPG: 90-712- Pitt-Tech Interior/ Exterior DTR Industrial Primer/Finish (<123 g/LVOC)
- 4) S-W: Pro Industrial Pro-Cryl Universal Primer, B66-310 (<100 g/L VOC).
- 5) Tnemec: Series 27WB Typoxy, waterbased (6.6 g/L)

b. Two (2) coats, two component, water-based epoxy (gloss):

- 1) Behr: Monochem Epoxyguard Enamel Pre-Catalyzed Waterbased Epoxy Semi-Gloss 4050 (2 g/L)
- 2) BM: Corotech V341Pre-Catalyzed Waterborne Epoxy Semi-Gloss (< 70 g/L VOC).
- 3) PPG: 16-510 Pitt-Glaze WB1 Pre-Catalyzed Epoxy Semi-Gloss (95g/L VOC)

- 4) S-W: Pro Industrial Waterborne Catalyzed Epoxy, B73-300 Series (<50 g/L VOC).
 - 5) Tnemec: Series 27WB Typoxy, waterbased (6.6 g/L)
3. Galvanized-Metal Substrates & Ductwork:
 - a. One (1) coat, water based primer:
 - 1) Behr: Behr Premium Plus Int/Ext Multi-Surface Primer & Sealer 436 (50 g/L)
 - 2) BM: P04 Super Spec HP Acrylic Metal Primer (54 g/L)
 - 3) PPG: 90-712 Pitt-Tech Interior/Exterior DTM Industrial Primer/Finish (123 g/L VOC).
 - 4) S-W: Pro Industrial Pro-Cryl Universal Primer, B66-310 (< 100 g/L VOC).
 - 5) Tnemec: Series 115 Uni-bond DF
 - b. Two (2) coats, Water based enamel (satin):
 - 1) Behr: Behr Premium Plus Interior Satin Enamel 7050 (5 g/L)
 - 2) BM: N538 Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (0 g/L)
 - 3) PPG: 90-474 Pitt-Tech Interior/Exterior Satin DTM Industrial Enamel (227 g/L VOC).
 - 4) S-W: Pro Industrial High Performance Acrylic EgShel, B66-660 (< 50 g/L VOC).
 - 5) Tnemec: Series 1026 Enduratone (48 g/L).
4. Overhead Metal Roof Decking – (PrePrimed Steel):
 - a. Two (2) coats, Water Based Interior Dry Fog:
 - 1) Behr: Behr Pro Dryfall Paint Flat White 890 (50 g/L) Black 891 (50 g/L)
 - 2) BM: Coronado N110 Super Kote 5000 Dry Fall Latex Flat (<150g/L)
 - 3) PPG: 6-725XI SpeedHide SuperTech WB Flat Dry Fog (< 30 g/L VOC) or 6-724XI SpeedHide SuperTech WB Semi Dry Fog (< 29 g/L VOC)-self priming.
 - 4) S-W: Pro Industrial Acrylic Dryfall, B42-80 Series, Flat, EgShel, or Semi-Gloss (< 50 g/L VOC) .
 - 5) Tnemec: Series 115 Uni-bond DF
5. Overhead Metal Roof Decking – (Galvanized):
 - a. Two (2) coats, Water Based Interior Dry Fog:
 - 1) Behr: Behr Pro Dryfall Paint Flat White 890 (50 g/L) Black 891 (50 g/L)
 - 2) BM: Coronado N110 Super Kote 5000 Dry Fall Latex Flat (<150g/L)
 - 3) PPG: 6-725XI SpeedHide SuperTech WB Flat Dry Fog (< 30 g/L VOC) or 6-724XI SpeedHide SuperTech WB Semi Dry Fog (< 29 g/L VOC)-self priming.
 - 4) S-W: Pro Industrial Waterborne Acrylic Dryfall, B42-80 Series (<50 g/L VOC) Flat, EgShel, or SemiGloss.
 - 5) Tnemec: Series 115 Uni-bond DF

E. Wood Substrate:

1. Doors, Frames, Trim and Chair Rails

a. Opaque Alkyd System:

1) One (1) coat, latex primer:

- a) Behr: Behr Premium Plus All-In-One Primer & Sealer 75 (5 g/L)
- b) BM: 0790 Advance Waterborne Interior Primer (44g/L VOC)
- c) PPG: Seal Grip Primer, 17-921 (<84 g/L VOC).
- d) S-W: Preprite Problock Latex, B51-600 (<50 g/L VOC).

2) Two (2) coats, alkyd/oil enamel (semi-gloss):

- a) Behr: Behr Int/Ext Alkyd Semi-Gloss Enamel 3900 (50 g/L)
- b) BM: 0793 Advance Waterborne Interior Semi-Gloss (48g/L VOC)
- c) PPG: 6-1510 SpeedHide Interior/Exterior WB Alkyd Semi (37 g/L VOC).
- d) S-W: ProMar 200 WB Acrylic-Alkyd Semi-Gloss, B34-8200 (<100 g/L VOC).

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Masonry (CMU): 12 percent.
 - 2. Wood: 15 percent.
 - 3. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END 09 91 23.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Surface preparation and field application of high-performance coating systems for exposed ferrous metal surfaces as follows:
 - a. Interior and exterior ferrous metal.
 - b. Exterior galvanized metal.
- B. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements."
 - 2. Section 05 12 00 "Structural Steel Framing".
 - 3. Section 05 12 13 "Architectural Exposed Structural Steel".
 - 4. Section 09 91 13 "Exterior Painting" for general exterior field painting.
 - 5. Section 09 91 23 "Interior Painting" for general interior field painting.

1.2 DEFINITIONS

- A. Standard coating terms defined in ASTM D 16 apply to this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For each coating system indicated. Include primers.
 - 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference the specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each material specified.
- B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.
 - 1. Provide stepped Samples defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
 - 2. List of material and application for each coat of each sample. Label each sample for location and application.
 - 3. Submit samples on the following substrates for Architect's review of color and texture:
 - a. Ferrous Metal: Provide three 4-inch- square samples of flat metal and three 8-inch- long samples of solid metal for each color and finish.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Coatings: 5 percent, but not less than 1 gallon of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed high-performance coating system applications similar in material and extent to those indicated for Project and whose work has a record of successful in-service performance.
- B. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.
- B. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select items and surfaces to represent surfaces and conditions for application of each coating system.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. 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 materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label with the following information:
 - 1. Name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.

8. Handling instructions and precautions.

- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - 1. Protect materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and applying coatings.

1.8 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 45 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 - 1. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.
 - 2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and temperature within the area can be maintained within limits specified by manufacturer during application and drying periods.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- D. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 1. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 - 2. Products shall be of same manufacturer for each coat in a coating system.
- B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
6. Pretreatment Wash Primers: 420 g/L.
7. Floor Coatings: 100 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

C. Colors: Match Architect's samples.

2.3 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Ferrous Metal: Provide the one of the following finish systems over exterior ferrous-metal surfaces. Entire system will be by the same manufacturer.

1. Semi-Gloss Finish: One finish coat over an intermediate coat and a primer.
 - a. Primer: Zinc-rich metal primer applied at spreading rate recommended by manufacturer @ 2.5 – 3.5 mils DFT.
 - 1) Behr: Jotun Barrier AV Zinc Rich Epoxy Coating.
 - 2) PPG: 97-679 Durethane Moisture Cure Zinc Primer.
 - 3) S-W: Corothane I GalvaPac Zinc Primer.
 - 4) Tnemec 90-97 Tneme-Zinc.
 - b. Intermediate Coat: Epoxy applied at 3.0 to 6.0 mils DFT.
 - 1) Behr: Jotun Jotamastic 80 Epoxy Mastic.
 - 2) PPG: 97-130 Aquapon High Build Epoxy Semi gloss.
 - 3) S-W: Macropoxy 646 Fast Cure.
 - 4) Tnemec Inc.: Series N69 Hi-Build Epoxoline Polamidoamine Epoxy.
 - c. Topcoat: Aliphatic polyurethane enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.0 to 5.0 mils DFT.
 - 1) Behr: Jotun Hardtop XP Aliphatic Acrylic Polyurethane.
 - 2) PPG: 95-812 PittThane Ultra Aliphatic Urethane.
 - 3) S-W: Acrolon 218 Semi-gloss B65_600/B65V600.
 - 4) Tnemec Inc.: Series 1075 Endura-Shield.

B. Galvanized Metal: Acrylic Polyurethane Finish: One (1) coat of one of the following epoxy prime paints, one (1) intermediate coat of build epoxy and one (1) finish coat of acrylic polyurethane finish.

1. Epoxy Primer Coat: Epoxy primer applied at dry film thickness of 4.0 to 6.0 mils.
 - a. Behr: Jotun Jotamastic 80 Epoxy Mastic.
 - b. Carboline: Carboguard 893 SG.
 - c. Sherwin-Williams: Macropoxy 646, B58 Series.

- d. Tnemec Inc.: Epoxoline Series 66.
- 2. Intermediate Coat: Epoxy primer applied at dry film thickness of 4.0 to 6.0 mils.
 - a. Behr: Jotun Jotamastic 80 Epoxy Mastic.
 - b. Carboline: Carboguard 893 SG.
 - c. Sherwin-Williams: Acrolon Ultra High Performance Urethane, Gloss B65-820.
 - d. Tnemec Inc.: Epoxoline Series 66.
- 3. Polyurethane Finish Coat: Applied at dry film thickness of 3 -5 mils.
 - a. Behr: Jotun Hardtop XP Aliphatic Acrylic Polyurethane Gloss.
 - b. Carboline: Carbothane 133HB for Satin.
 - c. Sherwin-Williams: Acrolon Ultra High Performance Urethane, Gloss B65-820.
 - d. Tnemec Inc.: 1075 Color Endura-Shield II.

3. EXECUTION

3.1 EXAMINATION

- A. With Applicator present, examine substrates and conditions under which high-performance coatings will be applied, for compliance with coating application requirements.
 - 1. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.
 - 2. Start of application is construed as Applicator's acceptance of surfaces within that particular area.
- B. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.
 - 1. If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:
 - a. Confirmation of primer's suitability for expected service conditions.
 - b. Confirmation of primer's ability to be top coated with materials specified.
 - 2. Notify Architect about anticipated problems before using the coatings specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

- B. Cleaning: Before applying high-performance coatings, clean substrates of substances that could impair bond of coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
 - 2. Ferrous-Metal Substrates: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
 - a. Blast-clean steel surfaces as recommended by coating manufacturer and according to SSPC-SP 10/NACE No. 2.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer as the shop coat.
 - 3. Galvanized Surfaces:
 - a. Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
 - b. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized metal by cleaning with a neutral or mildly alkaline cleaner. Abrade surface by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.
- D. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
 - 2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
 - 3. Use only the type of thinners approved by manufacturer and only within recommended limits.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use applicators and techniques best suited for the material being applied.

2. Do not apply high-performance coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
 3. Coating colors, surface treatments, and finishes are indicated in the coating system descriptions.
 4. Provide finish coats compatible with primers used.
 5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 - a. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - b. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required is the same regardless of application method.
 - a. Omit primer on metal surfaces that have been shop primed and touchup painted.
 - b. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 - c. Where manufacturer's written instructions require sanding, sand between applications to produce a smooth, even surface.
 - d. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until coating has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat does not cause undercoat to lift or lose adhesion.
 2. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.
- C. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.

1. Recoat primed and sealed substrates if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.
- F. Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
 1. Provide "Wet Paint" signs to protect newly coated finishes. After completing coating operations, remove temporary protective wrappings provided by others to protect their work.
- C. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces. Comply with procedures specified in PDCA P1.

END 09 96 00.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. 2-part dry-erase coating.
- B. Related Sections
 - 1. Division 09 Section "Painting" for priming and sealing of gypsum board.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:
 - 1. 12 inch by 18 inch sample of dry-erase coating on each substrate finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 QUALITY ASSURANCE

- A. Fire Performance characteristics: Provide dry-erase coatings that comply with the fire performance characteristics indicated below. Identify components with markings from testing and inspection organization.
 - 1. ASTM E-84 (Fuel Contribution) – Class A, Flamespread 5, Smoke developed 0.
- B. Mockups: Build mockups, as directed by Architect, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original factory wrappings and containers, clearly labeled with manufacturer, brand name, and fire hazard classification.

- B. Store materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within the storage area at not less than 70 deg F during the period materials are stored.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Maintain ambient temperature within the building at not less than 68 deg F minimum 72 hours prior to beginning of installation Do not install dry-erase coating until spaces are enclosed and weatherproof and until the temperature is stabilized and a permanent lighting is in place. .

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PRODUCTS

- A. Dry Erase Coating
 - 1. Color: As selected by Architect from manufacturer's full range.
 - 2. Solids: 98.8 percent Part A, 66.2 percent Part B.
 - 3. Density: 12.18 lbs/gal Part A, 8.14 lbs/gal Part B.
 - 4. Opacity/Hiding Power (ASTM D2805): 98.3 percent.
 - 5. Sag Resistance (ASTM D4400 Method 6.5.6): 4.8.
 - 6. Flow and Leveling (ASTM D2801): 6.
 - 7. Crack Resistance (ASTM D522): 29 percent.
 - 8. Finish/Gloss (ASTM D523) on Dry Wall Board:
 - a. 20 degrees: 22.4.
 - b. 60 degrees: 66.0.
 - c. 85 degrees: 66.8.
 - 9. Scrub Resistance (ASTM D2486): Greater than 11,100 cycles.
 - 10. Stain Removal/Washability (ASTM D3450): 94.9 percent.

2.3 ACCESSORIES

- A. Primer: Manufacturer's standard primer as recommended for substrate indicated.
- B. Rollers for product application: Use roller as indicated by manufacturer for proper dry-erase coating application.

3. EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, to which dry-erase coating will be installed, with Installer present, for compliance with requirements specified in this that affect dry-erase coating installation for installation affecting performance of dry-erase coating.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Remove hardware, accessories, and similar items to allow dry-erase coatings to be installed.
 - 1. Plaster surface: Remove surface chalk. In new work use moisture meter to determine moisture content. Do not begin installation when moisture content is greater than five percent.
 - 2. Gypsum board surface: Recess nails and screws. Repair irregular tape joints, sand and remove dust.
 - 3. Painted surface: Remove loose paint or scale. Sand surface of enamel or gloss paint and remove dust with tac cloth or denatured alcohol.
 - 4. Ensure gypsum wallboard surfaces scheduled to receive dry-erase coatings are properly primed with recommended primer under Division 09, Section "Painting"
- B. Prime substrate as recommended by manufacturer.
- C. Ventilate area thoroughly to prevent the odor from permeating to other areas in the building.
- D. Mix components in strict accordance with manufacturer's instructions.
 - 1. Pot life: 1 hour maximum

3.3 INSTALLATION

- A. Install dry-erase coatings to comply with manufacturer's written instructions.
- B. Apply dry-erase coating with specified roller only or industrial spray application. Comply with the following for roller-application:
 - 1. Apply heavy single coat only. Do not recoat or touch up applied coating.
 - 2. Paint surface by working from one end to the other.
 - 3. Begin by cutting in the edges of an approximately 2 foot wide section.
 - 4. Paint 2 foot wide section, maintaining a wet edge.
 - 5. Roll new section into wet edge.
 - 6. Continuously check for skips, holes, and holidays as application progresses.
 - 7. Remove masking tape within 1 hour of painting.
- C. Coating shall cure for a minimum of 4 days after application before use.

- D. Application Rate: 5 mils wet film thickness as measured with a wet film gage; maximum 50 square feet per quart.

3.4 CLEANING

- A. Clean exposed surfaces of dry-erase coatings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

3.5 PROTECTION

- A. Protect installed product and finished surfaces from damage during construction.

END 09 97 35.

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following::

1. Panel signs.
2. Room-identification signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples: For each exposed product and for each color and texture specified.

D. Sign Schedule: Use same designations specified or indicated on Drawings in the signage schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

B. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and Illinois Accessibility Code for signs.

2.3 SIGNS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ASI Sign Systems, Inc.
 - 2. InPro Corporation (IPC).
 - 3. Poblocki Sign Company, LLC.
- B. Panel Sign – Building Address: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Solid-Sheet Sign: Stainless-steel sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph below and as follows:
 - a. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
 - 2. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 - 3. Mounting: Projecting from wall with concealed anchors.
 - 4. Surface Finish and Applied Graphics:
 - a. Integral Stainless-Steel Finish: No. 8 mirror finish.
 - b. Baked-Enamel or Powder-Coat Finish and Graphics: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
- C. Room-Identification Signs: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Basis-of-Design Product: Indicated on Drawings.

2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
 - b. Subsurface Graphics: Reverse halftone or dot-screen image.
 - c. Color(s): As selected by Architect from manufacturer's full range.
 3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 4. Mounting: Surface mounted to wall with adhesive or two-face tape.
- D. Way-Finding Interior Signs: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
 - b. Subsurface Graphics: Reverse halftone or dot-screen image.
 - c. Color(s): As selected by Architect from manufacturer's full range.
 2. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 3. Mounting: Surface mounted to wall with adhesive or two-face tape.

2.4 PANEL-SIGN MATERIALS

- A. Stainless-Steel Sheet: Type 316.
- B. Acrylic Sheet: ASTM D 4802, Type UVF (UV filtering).
- C. Polycarbonate Sheet: Coated, mar-resistant, UV-stabilized polycarbonate, with coating on both sides.

2.5 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly, unless otherwise indicated.

- B. Adhesive: As recommended by sign manufacturer.
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.6 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
- B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.
- C. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- D. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.
- E. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

3. EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Mounting Methods:
 - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface,

embedding studs in holes. Temporarily support sign in position until adhesive fully sets.

2. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
3. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

C. Remove temporary protective coverings and strippable films as signs are installed.

END 10 14 23

DIVISION 10 -SPECIALTIES
Section 102113.17 - Phenolic-Core Toilet Compartments

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Phenolic-core toilet compartments configured as toilet enclosures and urinal screens.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for supports that attach floor-and-ceiling-anchored compartments to overhead structural system.
 - 2. Section 06 10 53 "Miscellaneous Rough Carpentry" for blocking overhead support of floor-and-ceiling-anchored compartments.
 - 3. Section 10 28 00 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.2 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 toilet compartments.
- B. Shop Drawings: For toilet compartments.
 - 1. Include plans, elevations, sections, details, and attachment details.
 - 2. Show locations of cutouts for compartment-mounted toilet accessories.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show locations of floor drains.
 - 5. Show overhead support or bracing locations.
- C. Samples for Initial Selection: For each type of toilet compartment material indicated.
 - 1. Include Samples of hardware and accessories involving material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
 - 1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
 - 2. Each type of hardware and accessory.
- E. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Product Certificates: For each type of toilet compartment.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Door Hinges: One hinge(s) with associated fasteners.
 - 2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
 - 3. Door Bumper: One door bumper(s) with associated fasteners.
 - 4. Door Pull: One door pull(s) with associated fasteners.
 - 5. Fasteners: Ten fasteners of each size and type.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the 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.

2.3 PHENOLIC-CORE TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Accurate Partitions Corp., an ASI Group Company.
 - 2. Bobrick Washroom Equipment, Inc.
 - 3. Bradley Corporation.
- B. Toilet-Enclosure Style: Overhead braced, Floor anchored.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, Screen, and Pilaster Construction: Solid phenolic-core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges. Provide minimum 3/4-inch-thick doors and pilasters and minimum 1/2-inch-thick panels.
- E. Pilaster Shoes and Sleeves (Caps): Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.
- F. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; aluminum.
- G. 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.

2.4 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
 - 1. Hinges: Manufacturer's minimum 0.062-inch-thick stainless steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
 - 2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
 - 3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
 - 4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless steel bumper at out-swinging doors[**and entrance-screen doors**]. Mount with through-bolts.

- 5. Door Pull: Manufacturer's heavy-duty cast-stainless steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: ASTM B221.
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless Steel Castings: ASTM A743/A743M.

2.6 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments designated as accessible.

3. EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch.
 - b. Panels and Walls: 1 inch.
 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- D. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END 10 21 13.17

1. GENERAL

1.1 SUMMARY

A. Base Bid: General Contractor to provide the following:

1. Public-use washroom accessories.
2. Private-use bathroom accessories.
3. Underlavatory guards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Full size, for each exposed product and for each finish specified.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

A. Products: Products will be indicated on Drawings.

2.4 PRIVATE-USE BATHROOM ACCESSORIES

- A. Products: Products will be indicated on Drawings.

2.5 UNDERLAVATORY GUARDS

- A. Underlavatory Guard:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Plumberex Specialty Products, Inc.
 - b. Truebro by IPS Corporation.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

3. EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F446.

END 10 28 00.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Fire-protection cabinets for portable fire extinguishers.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - b. Larsens Manufacturing Company.

- c. Potter Roemer LLC.
- B. Cabinet Construction: Nonrated or fire rated in accordance with adjacent wall construction.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet.
- D. Recessed Cabinet:
 - 1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
- E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
- F. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
- G. Cabinet Trim Material: Same material and finish as door.
- H. Door Material: Aluminum sheet.
- I. Door Style: Solid opaque panel with frame.
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- K. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
 - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Horizontal.

4. Alarm: Manufacturer's standard alarm that actuates when fire-protection cabinet door is opened and that is powered by batteries or low voltage, complete with transformer.

L. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Color: As selected by Architect from manufacturer's full range.
2. Aluminum: ASTM B221 for extruded shapes and aluminum sheet, with strength and durability characteristics of not less than Alloy 6063-T5 for aluminum sheet.
 - a. Finish: Baked enamel or powder coat.
 - b. Color: As selected by Architect from full range of industry colors and color densities.

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

END 10 44 13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

2. PRODUCTS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.3 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Badger Fire Protection.
 - c. Guardian Fire Equipment, Inc.
 - d. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - e. Kidde Residential and Commercial Division.
 - f. Potter Roemer LLC.
 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Multipurpose Dry-Chemical Type: UL-rated 3A:40B:C nominal capacity, unless otherwise indicated, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

2.4 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

END 10 44 16.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Phenolic Lockers.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.
- D. Product Schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. For Installer.
- C. Sample Warranty.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations: Obtain phenolic lockers and accessories from single source from single locker manufacturer.
 - 1. Obtain locks from single lock manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

2.4 PHENOLIC ATHLETIC LOCKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ASI Storage Solutions; ASI Group.
 2. Lyon Workspace Products, LLC.
 3. Penco Products, Inc.
 4. Republic Storage Systems, LLC.
 5. Foreman Locker Systems.
 6. Summit Lockers
- B. Materials:
1. Doors, Side and Back Panels, Tops, Bottoms and Shelves, End Covers & all Filler panels to be a minimum of 1/2 inch thick solid phenolic core construction. Surface and edges shall be non-porous and shall not support fungus or bacteria. Provide material which has been selected for uniform color, surface flatness and smoothness. Exposed surfaces which exhibit discolorations, pitting, seam marks, roller marks, stains, telegraphing of core material, or other imperfections on finished units are not acceptable. Defects such as chipping along edges and corners are unacceptable.
- C. Construction:
1. Doors shall be fitted with recessed handle, number plate, padlock hasp, and optional locking device. Perimeter ventilation. Doors shall be mounted to side panel using powder coated steel or stainless steel piano-type hinges and machined fasteners. Door edges shall be smooth and chamfered with corners radiused.
 2. Side Panels shall be attached to all Tops, Bottoms, and Shelves, using rust-resistant and steel fasteners. Exposed edges shall be smooth and chamfered.
 3. Tops, Bottoms, and Shelves shall be attached to all Side Panels, using rust-resistant and steel fasteners. Exposed edges shall be smooth and chamfered.
 4. The color and texture of the finish on Phenolic Lockers is determined by the selected decorative plastic laminate pattern.
- D. Hardware:
1. Doors
 - a. Hinges shall be of powder coated steel or stainless steel
 - b. Door Latches shall be mounted at the mid-point of each door. Hasps shall be mounted below each handle and will accept standard padlock styles.
 2. Fasteners shall be of rust resistant door hinges and latches, and handles will be mounted with rivets and/or machine screws. Hooks and number plates will be mounted with rivets.
 3. End Cover Panels will be mounted with stainless steel barrel screws.
 4. Locker Units can be banked together with stainless steel barrel screws.
- E. Style: To be determined.
- F. Size: A minimum 12 inch x 12 inch x 72 inch.

G. Color: As selected by Architect from manufacturer's full range.

END 10 51 13.17.

DIVISION 10 -SPECIALTIES
Section 10 51 43 - Wire Mesh Storage Lockers

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Wire mesh storage lockers.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.
- D. Delegated-Design Submittal

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Qualification Data: For Installer.
- C. Welding certificates.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. American Wire Inc.
 2. California Wire Products Corporation.
 3. Folding Guard Corporation.
 4. Jesco Industries, Inc.
 5. King Wire Partitions, Inc.
 6. SpaceGuard Products.
 7. WireCrafters, LLC.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage an Illinois licensed Structural Engineer, as defined in Section 01 40 00 "Quality Requirements," to design wire mesh units.

2.4 MATERIALS

- A. Steel Wire: ASTM A510.
- B. Steel Plates, Channels, Angles, and Bars: ASTM A36/A36M.
- C. Steel Sheet: Cold-rolled steel sheet, ASTM A1008/A1008M, Commercial Steel (CS), Type B.
- D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B, with G60 zinc (galvanized) or A60 zinc-iron-alloy (galvannealed) coating designation.
- E. Panel-to-Panel Fasteners: Manufacturer's standard steel bolts, nuts, and washers.
- F. Post-Installed Anchors: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
 - 1. Material: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
- G. Power-Driven Fasteners: ICC-ES AC70.

2.5 WIRE MESH STORAGE LOCKERS

- A. Unit Sizes: To be determined.
- B. Mesh: 0.135-inch- diameter, intermediate-crimp steel wire woven into 1-1/2-inch diamond or 1-by-2-inch rectangular mesh.
- C. Wall Panels: 1-1/4-by-1-1/4-by-1/8-inch steel angle framing on top, bottom, and back sides, and 3-by-1/8-inch cold-rolled steel flat bar framing on front side, with wire mesh welded to framing.
 - 1. Horizontal Panel Stiffeners: 1-1/4-by-1-1/4-by-1/8-inch steel angles or 3/4-by-1/4-inch hot-rolled steel flat bars.
- D. Tops: 0.028-inch- thick, metallic-coated steel sheet.
- E. Horizontal Dividers/Shelves: 0.043-inch- thick, metallic-coated steel sheet with flanged edges and reinforced across width with 3/4-by-1/4-inch steel stiffeners.
- F. Doors: Fabricated from same mesh as wall panels, with framing fabricated from 1-1/4-by-1-1/4-by-1/8-inch steel angles on four sides with wire mesh welded to framing. Include padlock hasp.
 - 1. Hinges: Full-surface type, 2-1/2-by-2-1/2-inch steel, 1 pair per double-tier door; bolted, riveted, or welded to door and jamb framing.

G. Finish for Uncoated Ferrous Steel: Powder-coated finish unless otherwise indicated.

1. Color: As selected by Architect from manufacturer's full range.

2.6 FABRICATION

A. General: Fabricate wire mesh storage lockers from components of sizes not less than those indicated. Use larger size components as recommended by wire mesh manufacturer. Furnish bolts, hardware, and accessories required for complete installation with manufacturer's standard finishes.

1. Fabricate wire mesh storage lockers to be readily disassembled.
2. Welding: Weld corner joints of framing and grind smooth, leaving no evidence of joint.

B. Wire Mesh Storage Lockers: Fabricate initial storage locker with front and two sides. Fabricate additional storage lockers as add-on units designed to share one side with initial storage locker.

1. Fabricate wall panel and door framing with slotted holes for connecting adjacent panels.
2. Prehang doors in factory.

2.7 STEEL AND IRON FINISHES

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

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on powder-coat finish, suitable for use indicated, with a minimum dry film thickness of 2 mils.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

A. (9.5-mm-) (305 mm) (305 mm)END 10 51 43.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Interior bike storage units.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 018113 "Sustainable Design Requirements" for submittal requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CycleSafe, Inc.
 - 2. Dero.
 - 3. Saris Cycling Group.
- B. Rack Style: Floor mounted, with bikes hung vertically.
- C. Module Capacity: As indicated on Drawings.
- D. Finish: Manufacturer's standard powder-coat finish.

- E. Locking: Provide modules capable of accepting user locks (e.g. u-locks).

2.3 MATERIALS

- A. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.

2.4 FASTENERS

- A. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.5 FABRICATION

- A. General: Fabricate bicycle storage units square, rigid, and without warp, with metal faces flat and free of dents or distortion.
- B. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles.
- C. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- F. Factory Assembly: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.6 FINISHES

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Finish all steel surfaces and accessories.
- C. Powder-Coat Finish: Manufacturer's standard baked powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

1. Color: Black.

END 10 51 46.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

1. Mail receptacles.

1.2 ACTION SUBMITTALS

- A. Product Data.
B. Shop Drawings.
C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
B. Sample warranty.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MAIL RECEPTACLES

- A. Front-Loading Mail Receptacles Insert drawing designation: USPS-STD-4C; consisting of multiple compartments with fixed, solid compartment backs, enclosed within a recessed wall box.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. AF Florence Manufacturing Company; Gibraltar Industries.
 - b. Bommer Industries, Inc.
 - c. Jensen Mailboxes; Architectural Building Products Division of Steel Craft Corporation.
 - d. Salsbury Industries.

2. Front-Loading Master Door: Fabricated from extruded aluminum and braced and framed to hold compartment doors; prepared to receive master-door lock.
 - a. Master-Door Lock: Door prepared to receive lock provided by local postmaster.
3. Compartments: As indicated on Drawings.
4. Compartment Doors: Fabricated from extruded aluminum. Equip each with lock and tenant identification as required by USPS-STD-4C. Provide mail slot in the compartment with master-door lock.
 - a. Compartment-Door Locks: USPS-L-1172C; with three keys for each compartment door.
5. Frames: Extruded aluminum or aluminum sheet; ganged and nested units, with cardholder and blank cards for tenant's identification within each compartment.
6. Concealed Components and Mounting Frames: Aluminum or steel sheet.
7. Exposed Aluminum Finish:
 - a. Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.

2.3 FABRICATION

- A. Form postal specialties to required shapes and sizes, with true lines and angles, square, rigid, and without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges and corners free of sharp edges and burrs and safe to touch. Fabricate doors of postal specialties to preclude binding, warping, or misalignment.
- B. Preassemble postal specialties in shop to greatest extent possible to minimize field assembly.
- C. Where dissimilar metals contact each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other permanent separation as recommended by manufacturers of dissimilar metals.

END 10 55 00.13.

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. PVC-coated wire clothes closet shelving.
 - 2. PVC-coated wire linen closet ventilated shelving.
 - 3. Accessories as required for a complete installation.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MATERIALS

- A. Materials: Grade C-1006 bright basic cold drawn steel wire, average tensile strength 100,000 psi.
 - 1. Rod Sizes: Front rod minimum 0.306 in. diameter and back rods 0.243 in. diameter.
- B. Fabrication: Provide PVC coated steel rod ventilated shelving and rod. All rods resistance welded at intersections of cross deck wires. Deck rod spacing shall be on one-inch increments.
 - 1. Support Spacing: Provide shelf brackets at not over 3'-6" o.c.
 - 2. Fasteners: As recommended by system manufacturer for substrate and loads to be supported; provide blocking between studs as required.
- C. Finish: Metal shall be cleaned, primed, and a given a coating of PVC (vinyl coating) applied to a 9 to 11 mil thickness or a anti-marring hybrid epoxy that is non-porous and non-absorbent at 3 to 5 mils thickness. The coating is electrostatically applied and oven cured to provide

continuous coverage on all surfaces. Elasticity of coating shall be sufficient to prevent chipping and cracking.

- D. Provide securely adhered rubber end caps on all cut ends.
- E. Provide closet systems complete with all fittings, brackets, and appurtenances required for installation.

END 10 57 23.

DIVISION 11 – LAUNDRY EQUIPMENT
Section 111100 – Commercial Laundry Equipment

1. GENERAL

1.1 SECTION INCLUDES

- A. This section includes the equipment as indicated on the foodservice “QL” series of drawings included in Volume 3 of the drawing set, basis of design equipment specification sheets, and design intent narratives.

1.2 RELATED DOCUMENTS

- A. Drawings and other general provisions of Contract, including General and Supplementary Conditions and Division -1 Sections, apply to this Section.
 - B. Division II Section: For Residential Appliances.
 - C. Refer to Division 22 Sections for supply and exhaust fans; exhaust ductwork; service roughing-ins; drain traps; atmospheric vents; valves, pipes, and fittings; fire-extinguishing systems; and other materials required to complete laundry equipment installation
 - D. Division 26 Sections: Connections to fire alarm systems, wiring, disconnects, and other materials necessary to complete electrical hook up of the laundry equipment.
 - E. Division 23 Sections: Ductwork, fans, drives and other materials necessary to complete the mechanical venting hook up of food service equipment.
 - F. Food service equipment specification cutsheets provided as a supplement to the 114000 specifications. Specification sheets represent the make/models used to generate the layout and utility data as well as the base performance level of equipment for this project. Alternate man
- GENERAL

1.3 SCOPE OF WORK

- A. General: Provide and install all laundry equipment with related items necessary to complete the work shown on the drawings and required by the provisions of this section.
 - 1. The term "install" shall mean the delivery of all laundry equipment complete with transportation charges prepaid to the building, uncrated, set in place, and properly anchored where required.
 - 2. Deliver all parts, which are to be built into cast-in-place concrete or masonry, in ample time for inclusion in the concrete or masonry work. Furnish all necessary setting plans and instructions, oversee the installation of all parts in the masonry of concrete and be responsible for the correctness and accuracy of location and installation.
 - 3. Keep premises clean and remove from site all crates, cartons, and other debris resulting from work. Leave all areas "broom clean", and equipment "construction clean". Final cleaning of equipment by Laundry Equipment Contractor.

1.4 MECHANICAL AND ELECTRICAL WORK INCLUDED IN LAUNDRY EQUIPMENT WORK

- A. Plumbing: Interplumb laundry equipment between valves, vacuum breakers, and equipment connections, and make ready for final connection by Plumbing Contractors.
 - 1. Extend all indirect wastes not connected to the sewage system with black painted pipe. Drain extensions shall drip over and into floor drain. Where drain runs under an item of equipment, provide proper support from bottom of equipment to eliminate interference with the floor cleaning. All horizontal piping to be run at highest possible elevation, not less than 6" above floor, through equipment whenever possible.
 - 2. Provide additional general purpose drains as required.
- B. Electrical:
 - 1. Interwire laundry equipment between heating elements, switches, starters, thermostats, outlets, motors, and solenoids complete to junction box, terminal box or disconnect switch.
 - 2. Furnish and install all switches including disconnect switches within equipment, contactors, combination starters with fused disconnect, controls and similar items necessary for safe and proper operation of the equipment.
- C. Ventilation:
 - 1. Furnish and install all ductwork required for interconnection between equipment items, ready for final connections only. Above finished ceiling, provide fire dampers where required.
 - 2. Furnish booster fan on runs exceeding sixty (50) feet.

1.5 RELATED WORK SPECIFIED ELSEWHERE

- A. Floor depressions indicated on the drawings and where required.
- B. Required holes and recesses for piping and ducts, provided with information as to location and size is furnished to other trades in adequate time to be incorporated in the work.
- C. Roughing-in wiring for the laundry equipment and final connection between roughing-in points and points of connection (pigtails or terminals) on the laundry equipment; connections to the equipment shall be in accordance with equipment wiring diagrams.
- D. Extra wall receptacles required for the laundry area.
- E. Required disconnect switches between roughing-in points and points of connection to the equipment.
- F. Providing and installing of traps, strainers and valves, as well as other items furnished by the Laundry Equipment Contractor and making final connections to the equipment.
- G. Final connections between the ductwork and the building ventilation system.
- H. Roughing-in, furnishing and installing all hot and cold water piping between roughing-in points and points of connection on the equipment, providing in each water line a shutoff valve, and

where required, a pressure reducer and regulator, and making final connection to the laundry equipment.

- I. Waste piping, traps, and vents, and final connections to drain outlets of laundry equipment.

1.6 SUBMITTALS

- A. Laundry Equipment Contractor shall coordinate submittal due dates with the Construction Schedule for this Project.
- B. Brochures:
 - 1. Submit complete brochure booklets containing manufacturer's specification catalog pages with all pertinent engineering and dimensional data identified, together with typewritten cover pages for each "buy-out" item to the Laundry Consultant for preliminary review and comment. One (1) copy of brochure with comments noted, will be returned for correction. Resubmit required amount of revised completed brochures to the Architect for final approval and distribution.
 - 2. Brochures to be suitably bound and to contain manufacturer's illustration sheet for each manufactured or "buy-out" item, with typewritten cover sheet for each item, indicating the quantity required, list of accessories required, mechanical & electrical characteristics and other pertinent data.
 - 3. Arrange items in numerical order following scheduled Item Numbers. Brochures shall be complete, covering all manufactured or "buy-out" items of equipment. No consideration will be given to partial lists made at various times.
- C. Roughing-in or Mechanical Connection Drawings:
 - 1. Submit copies to the Laundry Consultant for preliminary review and comment. One (1) print with comments noted, will be returned for correction. Submit the required amount of corrected copies to the Architect for final approval and distribution.
 - 2. Prepare roughing-in drawings of all equipment shown on Contract drawings. Prepare drawings at 1/4" scale on sheet of same size as Contract Drawings, showing all the mechanical roughing-in (including sleeves and conduit) for electric, water, ventilation, condensate drain lines, air and exhaust connections and characteristics, and roughing-in data for all services in each area. Indicate the approximate location of the laundry equipment with allowances for traps, switches and other final connection requirements.
 - 3. Dimension each roughing-in location accurately from column center lines and/or walls (not partition walls).
 - 4. Assume responsibility for proper location of sleeves and conduits through which the utility lines will be installed, and for conforming to roughing-in location with the laundry equipment and connections thereto, or compensate the other trades for any necessary relocation of the roughing-in. Make field inspection before the finished floors are laid and relocate sleeves as necessary.
- D. Field Measurements:

1. Make field measurements giving due consideration to any architectural, mechanical, or structural discrepancies which may occur during construction of the building. No extra compensation will be allowed for any difference between actual dimensions and designed dimensions.
2. Submit any differences found during field measurements to the Architect for consideration before proceeding with the installation.

1.7 STANDARDS

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 1. National Electric Code (N.E.C.)
 2. Underwriters' Laboratories, Inc. (UL)
 3. Uniform Mechanical Code (U.M.C.)
 4. National Electric Manufacturers Associations (NEMA)
- B. No extra charge will be paid for furnishing items required by governing codes and regulations, but not specified or shown on drawings.

1.8 GENERAL REQUIREMENTS

- C. Electrical: (Check voltage requirements on job before ordering any electrically operated equipment.)
 1. All electric units and equipment shall be of voltages indicated. Differences in current characteristics of equipment listed and that available must be submitted to the Architect for consideration before the equipment is ordered.
 2. All internal wiring of the equipment to the outlets on the equipment shall be by the Laundry Equipment Manufacturer in accordance with National Electric Code, and/or jurisdictional governing agencies.
 3. All electrically operated equipment shall conform with the Rules and Regulations and the Laws of the State of the particular installation and shall be approved by the Electrical Inspector or the Underwriters' Laboratories.
 4. All electrically operated manufactured items of equipment shall have Underwriters' Laboratories approval or UL re-examination listed in every case where such approval has been established for the particular device in question.
- D. Building Code Requirements:
 1. "Built-in" pieces of equipment shall be installed in strict compliance with the applicable state building codes or the local authority having jurisdiction. This equipment shall also comply with all other applicable codes.

2. PRODUCTS

2.1 EQUIPMENT

- A. Refer to the Laundry Equipment Narrative, QL Series of drawings in Volume 2 and the basis of design specification sheets.

2.2 NAMEPLATES

- A. Each item of manufactured or "buy-out" equipment furnished under this contract shall be provided with identifying nameplate of corrosion resistant material giving name and address of manufacturer, catalog and serial numbers, and other identifying information for use in securing replacement parts.
- B. Nameplate shall fit snugly against the surface of the item, shall be free of rough edges.

2.3 WARRANTY AND SERVICE

- A. Provide a listing of factory authorized service agencies and copies of written service and warranty agreements on all laundry equipment items. Provide written warranty agreeing to replace free of charge any work, equipment, parts, material and/or workmanship which become defective during the warranty period (except that which becomes defective due to abuse of the equipment). Replacement shall be made without cost to the Owner, and the Laundry Equipment Contractor shall reimburse the other contractors for extra work involved in the replacement of defective equipment. Warranty period is for one year from date of final acceptance of installation by Owner.

2.4 MATERIALS

- A. Stainless Steel: ANSI Type 304. Provide non-magnetic sheets, free of buckles, waves and surface imperfections. Provide No. 4 polished finish for exposed surfaces.
 - 1. Provide protective covering on polished surfaces of stainless steel sheet work, and retain/maintain until time of final testing, cleaning, start up and substantial completion.
- B. Galvanized Sheet Steel: ASTM A 526, except ASTM A 527 for extensive forming; ASTM A 525, G90 zinc coating, chemical treatment.
- C. Sheet Steel: ASTM A 569 hot rolled carbon steel.
- D. Stainless Steel Tube: ASTM A 554, type 304 with No. 4 polished finish.
- E. Aluminum: ASTM B 209 sheet and plate, ASTM B 221 extrusions, 0.40 mil clear anodized finish where exposed, unless otherwise indicated.
- F. White Metal: Corrosion resistant metal containing not less than 21 percent nickel. Make castings free from pit marks, runs, checks, burrs and other imperfections; rough grind, polish and buff to bright luster.
 - 1. In lieu of white metal castings, 18-8 stainless steel die cast or stamped may be used.

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- G. Plastic Laminate: NEMA LD3, general purpose high pressure type, 0.05 inch thick except 0.042 inch thick for flat work and post forming, smooth texture, and color white unless otherwise indicated.
- H. Plastic Materials and Components: Except for plastic laminate, provide plastic materials and components that comply with NSF 51.
- I. Hardwood Work Surfaces: Laminated edge-grained hard maple (acer Saccharum), NHLA first grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded and finished with NSF approved oil sealer.
- J. Sound Deadening: Heavy bodied resinous coating, filled with granulated cork or other resilient material, compounded for permanent, non-flaking adhesion to metal in 1/8 inch thick coating.
 - 1. Apply coating of sound deadening material to underside of tops, drainboards, dishtables and sinks.
- K. Sealants: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Provide sealant, that when fully cured and washed, meets requirements of Food and Drug Administration regulation 21 CFR 177.2600.
 - 1. Color: As selected by architect with manufacturer's standard colors.
 - 2. Backer rod: Closed-cell polyethylene rod stock, larger than joint width.
- L. Gaskets: Solid or hollow (not cellular) neoprene or PVC; light gray, minimum 40 shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

2.5 FABRICATED PRODUCTS

- A. Handles and Pulls: Provide stainless steel handles with No. 4 finish, or die cast zinc with polished chrome-plated finish. Provide die stamped stainless steel pulls, recessed rectangular type, with beveled edge frame.
- B. Door Slides: Provide stainless steel or galvanized steel door slides with minimum load capacity of 100 pounds per pair, and with positive door stop. Provide ball bearing rollers.
- C. Hinges: Provide stainless steel hinges, continuous type or butt type as indicated.
- D. Sliding Door Hardware: Provide extruded aluminum door track. Provide galvanized steel door sheave with nylon surface and ball bearing inner races. Provide stainless steel bottom guide pins, spring loaded.
- E. Adjustable Shelf Supports: Provide stainless steel shelf supports, snap in type, and stainless steel brackets with countersunk mounting holes.
- F. Catches: For hinged doors, provide permanent magnetic catch of sufficient strength to hold door shut.
- G. Locks: Manufacturers standard brass 5-pin cabinet type lock. Provide two keys for each lock, keyed separately.
- H. Lever Drains: Provide 2-inch, heavy cast bronze body, removable flat stainless steel strainer, twist handle waste outlet, and one piece connected chrome plated brass overflow.

- I. Casters: Provide minimum 4-inch diameter wheel casters with 1 1/8 inch tread width, complying with NSF standards. Provide sealed, self-lubricating bearings, cadmium plated or bright zinc plated steel disc wheels, and solid synthetic rubber tires. Provide foot brakes on 2 casters per unit.

2.6 FABRICATION OF EQUIPMENT

- A. The owner/laundry consultant reserves the right to accept or reject any custom fabrication manufacturer. A list of at least three consultant references must be supplied for review and approval. The owner/food service consultant reserves the right to accept or reject any custom fabrication manufacturer that may not meet the capabilities of this project. Fabricator references from three food service consultants must be submitted prior to submitting final pricing using the proposed fabricator. The following list includes fabricators that can be considered for use and do not require pre-approval of the food service consultant:
 - 1. Keystone Custom Fabricators - Elizabeth, PA (412) 384-9131
 - 2. EMI Industries – Boonton, NJ (860) 920-7300
 - 3. Bova Corporation – Valencia, PA (724) 898-0288
 - 4. Kevry Stainless - Golden, CO (303) 271-9300
 - 5. American Stainless - Englewood, CO (303) 783-0005
- J. Tops: Fabricate of 14 gauge stainless steel, with exposed edges rolled on 1 1/2 inch diameter radius, and with corners bullnosed. Where tops are adjacent to walls or adjoining equipment, turn up ten inches and back two inches on a 45-degree angle, unless otherwise indicated.
- K. Backsplashes: Cove horizontal and vertical corners.
- L. Framing: Mount tops on 4 inch wide by 14 gauge stainless steel channels.
- M. Run framework around entire perimeter of unit, and cross brace on centers. For dishtables and drainboards, run framing from front to back at each leg location, and run additional channel lengthwise, located at center of table width and welded to leg channels. Fasten framing to underside of top surfaces with 1/4-inch studs welded at approximately 12-inch centers. Provide each stud with suitable chrome plated lockwashers and capnuts, and make stud lengths such that capnuts can be made up tight bringing top down snugly to framing.
- N. Legs and Cross Rails: Construct legs of 1 5/8 inch OD by 16 gauge stainless steel tubing, with fully enclosed stainless steel bullet shaped adjustable foot with minimum adjustment of 1 inch up or down without any threads showing. Fasten legs to 4-inch high stainless steel gusset with top completely sealed by means of stainless steel plate. Weld gusset continuously to bottom of unit framing. Construct cross rails of 1 1/4 inch O.D. by 16-gauge stainless steel tubing. Weld cross rails continuously to legs, grind and polish until smooth.
- O. Drawers: Lift out type drawer body, one piece 20 inch by 20 inch by 5 inch die stamped of 18 gauge stainless steel, with inside radiused corners. Construct front of double pan stainless steel, 16-gauge exterior and 20-gauge interior. Provide lock for each drawer.
 - 1. Fasten drawer suspension guides to 16-gauge stainless steel housing suspended from angle framing under fixed top.

- P. Cabinet Bodies: Construct of 18 gauge stainless steel, with end panels formed with round corners for freestanding units, and square corners for fixtures that adjoin walls or other fixtures. Provide 90-degree retentions on end panels at front and rear, turned in toward body of cabinet and welded for reinforcement. For cabinets with open shelving, provide double wall inner panels. Weld ends to horizontal angle or channel members to form integral cabinet base. Provide backs of same material as ends, with vertical edges turned in to match edges of ends. Weld making flush joint.
- Q. Sliding Doors: Construct of 18 gauge stainless steel with edges formed into channel extending around all sides, forming doors 7/8 inch thick. Insert sound deadening material, and enclose with stainless steel back panel with welded corner joints.
1. Mount doors on sliding door hardware.
 2. Construct doors so as to be removable for cleaning purposes, and provide with stops.
 3. Provide, on each door, recessed stainless steel pulls and locks.
- R. Hinged Doors: Construct same as sliding doors. Mount on stainless steel continuous type hinges, fitted with stainless steel pulls, magnetic catches and locks. Construct so that door face is flush with cabinet body.
- S. Shelves: Construct of 14-gauge stainless steel.
1. Bottom shelves: Extend forward and turn down at front so as to be flush with front facing of cabinet.
 2. Fixed intermediate shelves: Weld to front stiles and to 14 gauge stainless steel brackets so that shelf is 1 inch away from back and ends of cabinet.
 3. Adjustable shelves: Channel on all four sides, weld corners, and mount on removable stainless steel standards.
- T. Open Base Shelving: Construct of 16 gauge stainless steel with edges rolled down on open sides, and 2 inch turn up with 3/4 inch radius on rear and ends where adjacent to walls and other equipment. Neatly notch corners and weld to legs. Reinforce shelving longitudinally with 14 gauge formed channel welded to underside. Construct removable shelves as above, but fit over cross rails. Do not exceed shelving sections of 30 inches long; where one section abuts another, turn down edges one inch.
- U. Wall Shelves: Construct of 16 gauge stainless steel with 1 1/2 inch roll on front and exposed ends, and with 2 inch turn up on back and ends where adjacent to walls or other fixtures. Weld all corners. Construct wall brackets of 14-gauge stainless steel with 1 1/2-inch flange at wall and completely welded to underside of shelf. Fasten each bracket to wall with minimum of two 1/2-inch bolts anchored to wall. Fasten shelf to wall bracket by means of studs welded to shelf, and secure with lockwasher and chrome plated cap nuts. Install so that shelf sets 1 1/2 inch away from the wall.
- V. Overshelves: Set shelves mounted over equipment, not adjacent to walls, on 1 inch by 14 gauge stainless steel tubular standards fitted with stainless steel base flanges. Completely weld top of tubular standards to 14-gauge stainless support channels; run channels full width of oversheff. Run 1/2-inch steel tension rods through counter tops and reinforcing angle framing, secure with nuts and lockwashers to assure stable sway-free structure.
- W. Sinks: Fabricate from 14 gauge stainless steel with interior corners rounded to 1 inch radius, both horizontally and vertically, forming cove in bottom. Construct with butt-edge joints,

welded and ground smooth so no evidence of welding will appear. Divide multiple compartment sinks with double wall 14 gauge stainless steel partitions rounded to 1/2 inch radius on top and having corners rounded same as other corners in sinks, continuously welded in place with welds ground smooth and polished. Provide back, bottom and front of one continuous piece with no overlapping joints or open spaces between compartments. Pitch bottom of each compartment and crease to die stamped recess to receive lever type drain, without use of solder, rivets or welding.

1. Finish front and exposed ends of sink with 1 1/2 inch 180 degree rolled edge. Finish back and ends adjacent to walls or other fixtures with splash back. Punch back splash back to receive wall mounted faucets.
2. For sinks in worktops, construct as above, but omit roll edges with splash backs. Fabricate bowl so as to be flush with work surfaces

3. EXECUTION

3.1 OPENING - ACCESS

- A. General: Coordinate with other contractors for provision and scheduling of temporary openings in walls or floors which may be required for passing large sections of equipment into the building that cannot be accommodated through permanent openings.

3.2 INSTALLATION

- B. General: Make arrangements for receiving laundry equipment and make delivery into the building as requisitioned by installation superintendent. Do not consign any equipment to the Owner or to any other contractor without receiving written acceptance from them, and making arrangements for the payment of freight and handling charges.
- C. Deliver all equipment into the building, uncrate, assemble, level and repair any damaged or abraded surfaces. Set equipment temporarily in its final location to permit mechanical trades to take necessary measurements for the connection of the service lines. Move the equipment sufficiently to permit the installation of such service lines and then realign equipment level and plumb. Install all equipment so as to eliminate objectionable vibration.
- D. Coordinate with Divisions 22 & 26.
- E. Install all equipment, including existing reused items, per manufacturer's recommendations.

3.4 TESTING, DEMONSTRATING AND INSTRUCTION OWNER'S DESIGNATED PERSONNEL

- A. After complete installation, all items of equipment furnished under this Contract shall be operated a minimum of one (1) complete cycle and thoroughly tested to insure proper and safe operation.
- B. The Laundry Equipment Contractor shall arrange to have all mechanically operated equipment furnished under this Contract demonstrated by competent service representative, this

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representative to instruct the Owner's designated personnel in the use, care and maintenance of all items of equipment after same are in working order.

- C. Quietness of operation of all laundry equipment is a requirement. Contractor shall remove or repair all equipment producing excess noise over manufacturer's stated decibel level.

3.5 OPERATING AND MAINTENANCE MANUALS

- A. After completion of the installation, the Laundry Equipment Contractor shall present to the Owner three (3) sets of all operating and maintenance manuals covering all mechanically operated equipment furnished under this contract, the sets being neatly bound in a loose-leaf binder having a durable cover.
- B. Include in the binder a list of names, addresses and telephone numbers of local service agencies authorized to make necessary repairs and/or adjustments of the equipment furnished under this Contract.
- C. Provide three (3) copies of a proper maintenance schedule to be followed.

END 111100

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Roof anchors.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.

1.1 INFORMATIONAL SUBMITTALS

- C. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- D. Engineering Calculations.
- E. Structural Engineer Qualifications.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURER

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - 1. Highrise Systems, Inc.
 - 2. Pro-Bel Enterprises. Ltd.
 - 3. Tractel.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Stainless-Steel Plate, and Flat Bars: ASTM A 666, Type 304.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

- E. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- F. Fasteners: Stainless-steel, type 304, regular hexagon-head annealed stainless-steel bolts, nuts and, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts.
- G. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.
- H. Eye Bolts and Nuts: ASTM A 108, Grade 1030, cold-finished carbon steel.
- I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material: Stainless-steel, alloy Group 1 or 2. Bolts complying with ASTM F 593 and nuts complying with ASTM F 594.
- J. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.4 MAINTENANCE EQUIPMENT SUPPORT

- A. Safety U-bars: Stainless-steel, type 304.
 - 1. U-bars to be not less than 3/4" diameter material with 1-1/2" eye opening.
- B. Securement bolts:
 - 1. Stainless-steel, type 304.
- C. Steel tube section: Galvanized steel as above with yield strength of 50 Ksi. Wall thickness to suit application.
- D. Base plate and all other sections: Thickness and securement to suit application.
 - 1. Galvanized steel with yield strength of 44 Ksi.
- E. Miscellaneous bolts, nuts and washers: Type 304 stainless steel with yield strength of 35 Ksi.

2.5 ROOF ANCHORS

- A. Provide roof anchors complying with the following:
 - 1. Eye Bolts or U-bar Anchors: Stainless-steel, type 304.
 - 2. Eye bolts and U-bar openings shall be not less than 2" inside diameter opening.
- B. Securement bolts:
 - 1. Steel, Hot dipped galvanized to ASTM A123.

- C. Steel tube section:
 - 1. Steel, Hot dipped galvanized to ASTM A123.
- D. Base plate: Galvanized steel or stainless-steel, type 304.
 - 1. Steel, Hot dipped galvanized to ASTM A123.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to steel according to ASTM A 123/ A 123M. Fill vent holes and grind smooth after galvanizing.

3. EXECUTION

3.2 FIELD TESTING

- A. All anchors relying upon chemical adhesive fasteners to be 100% tested on site using load cell test apparatus in accordance with manufacturer's recommendations.
- B. Load cell test to apply minimum 5,000 lb. load without detachment or fracture occurring.

END 11 24 29

DIVISION 11 – FOOD SERVICE EQUIPMENT

Section 114000 – Food Service Equipment

1. GENERAL

1.1 SECTION INCLUDES

- A. This section includes the equipment as indicated on the foodservice “QF” series of drawings included in Volumes 2 and 3 of the drawing set, basis of design equipment specification sheets, and design intent narratives.

1.2 RELATED DOCUMENTS

- A. Drawings and other general provisions of Contract, including General and Supplementary
- B. Conditions and Division -1 Sections, apply to this Section.
- C. Division 22 Sections: Required drain traps, steam traps, atmospheric vents, valves, pipes and pipe fittings, duct work, and other materials necessary to complete mechanical hook up of food service equipment.
- D. Division 26 Sections: Wiring, disconnects, and other materials necessary to complete electrical hook up of food service equipment.
- E. Division 23 Sections: Ductwork, fans, drives and other materials necessary to complete the mechanical venting hook up of food service equipment.
- F. Food service equipment specification cutsheets provided as a supplement to the 114000 specifications. Specification sheets represent the make/models used to generate the layout and utility data as well as the base performance level of equipment for this project. Alternate manufactures have been listed with final approval of all equipment by the CDB.

1.3 SUBMITTALS

- A. Food Service Equipment Contractor shall coordinate submittal due dates with the Construction Schedule for this Project.
- B. Submit product data and installation instructions for each item; include rough-in dimensions, service connection requirements, performances, materials, manufacturers' model numbers, furnished accessories, power/fuel requirements, water/drainage requirements, and other similar information.
- C. Submit shop drawings including dimensioned rough-in drawings showing mechanical and electrical requirements. Submit dimensioned fabrication drawings for custom fabricated equipment including plans, elevations and sections, showing materials and gauges used.
- D. Submit maintenance data and parts lists for each item of food service equipment. Include
- E. Submit maintenance data and parts lists for each item of food service equipment. Include data, product data, shop drawings, and wiring diagrams in maintenance manuals. Two copies of the manual are to be provided.

- F. Provide instructional and maintenance videos for all buy-out equipment as available from manufacturers.

1.4 QUALITY ASSURANCE

- A. Manufacturers' Qualifications: Firms regularly engaged in manufacturer of food service equipment of types, capacities and sizes required, whose products have been in satisfactory use, in similar service, for not less than five projects.
- B. Installer's Qualifications: Engage an experienced installer who has completed food service similar in material, design, and extent to that indicated, for a project that has resulted in construction, with a record of successful in-service performance.
- C. Codes and Standards:
 - 1. NSF Standards: Comply with applicable National Sanitation Foundation (NSF) standards and recommended criteria. Provide each principal item of food service equipment with a NSF "seal of approval".
 - 2. UL Labels: Where available, provide UL labels on prime electrical components of food service equipment. Provide UL "recognized marking" on other items with electrical components, signifying listing by UL, where available.
 - 3. ANSI Standards: Comply with applicable ANSI standards for electric powered and gas burning appliances, for piping to compressed gas cylinders, and for plumbing fittings, including vacuum breakers and air gaps, to prevent siphonage in water piping.
 - 4. NFPA Codes: Install food service equipment in accordance with the latest version of the following National Fire Protection Association (NFPA) codes:
 - a. NFPA 54 - National fuel gas code.
 - b. NFPA 70 - National electrical code.
 - c. NFPA 96 - Removal of smoke and grease-laden vapors from commercial cooking equipment.
 - 5. ASME Boiler Code: Construct steam-generating and closed steam heating equipment to comply with American Society of Mechanical Engineers (ASME) boiler and pressure vessel code; Section IV for units not exceeding 15 PSI or 250° F (121° C), or Section I for higher pressure/temperature units.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver food service equipment in containers designed to protect equipment and finish until final installation. Make arrangements to receive equipment and hold in warehouse until delivery can be made to job site.
- B. Store food service equipment in original containers and in location to provide adequate protection to equipment while not interfering with other construction operations.
- C. Handle food service equipment to avoid damage to components, enclosures and finish. Do not install damaged food service equipment; replace and return damaged components to equipment manufacturer.

1.6 PROJECT CONDITIONS

- D. Take field measurements to assure accurate fit of fabricated equipment.
- E. Check electrical characteristics and water, steam and gas pressure. Provide pressure regulating valves where required for proper operation of equipment.

1.7 REFRIGERATION WARRANTY

- A. Special Project Warranty: Provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, refrigeration compressors with inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required, provided manufacturer's instructions for handling, installing, protecting and maintaining units have been adhered to during warranty period. This warranty shall be in addition to, and not a limitation of, the rights the owner may have against the contractor under the Contract Documents.
- B. Warranty Period: 5 years from date of substantial completion.
- C. All equipment items containing refrigerated components are to include a minimum two-year parts and labor, five-year compressor warranty.

2. PRODUCTS

2.1 FOOD SERVICE EQUIPMENT SCHEDULE

- A. Refer to the equipment schedules listed on the food service drawings for the food service equipment required for this project. Refer to the food service drawings for location of the items. Where discrepancies exist in quantity or size between drawings and schedules, the larger quantity/size must be considered as the correct information.

2.2 MATERIALS

- A. Stainless Steel: ANSI Type 304. Provide non-magnetic sheets, free of buckles, waves and surface imperfections. Provide No. 4 polished finish for exposed surfaces.
 - 1. Provide protective covering on polished surfaces of stainless steel sheet work, and retain/maintain until time of final testing, cleaning, start up and substantial completion.
- B. Galvanized Sheet Steel: ASTM A 526, except ASTM A 527 for extensive forming; ASTM A 525, G90 zinc coating, chemical treatment.
- C. Sheet Steel: ASTM A 569 hot rolled carbon steel.
- D. Stainless Steel Tube: ASTM A 554, type 304 with No. 4 polished finish.
- E. Aluminum: ASTM B 209 sheet and plate, ASTM B 221 extrusions, 0.40 mil clear anodized finish where exposed, unless otherwise indicated.
- F. White Metal: Corrosion resistant metal containing not less than 21 percent nickel. Make castings free from pit marks, runs, checks, burrs and other imperfections; rough grind, polish and buff to bright luster.

DIVISION 11 – FOOD SERVICE EQUIPMENT

Section 114000 – Food Service Equipment

1. In lieu of white metal castings, 18-8 stainless steel die cast or stamped may be used.
 - G. Plastic Laminate: NEMA LD3, general purpose high pressure type, 0.05 inch thick except 0.042 inch thick for flat work and post forming, smooth texture, and color white unless otherwise indicated.
 - H. Plastic Materials and Components: Except for plastic laminate, provide plastic materials and components that comply with NSF 51.
 - I. Hardwood Work Surfaces: Laminated edge-grained hard maple (*acer Saccharum*), NHLA first grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded and finished with NSF approved oil sealer.
 - J. Sound Deadening: Heavy bodied resinous coating, filled with granulated cork or other resilient material, compounded for permanent, non-flaking adhesion to metal in 1/8 inch thick coating.
 1. Apply coating of sound deadening material to underside of tops, drainboards, dishtables and sinks.
 - K. Sealants: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Provide sealant, that when fully cured and washed, meets requirements of Food and Drug Administration regulation 21 CFR 177.2600 for use in areas where it comes in contact with food.
 1. Color: As selected by architect with manufacturer's standard colors.
 2. Backer rod: Closed-cell polyethylene rod stock, larger than joint width.
 - L. Gaskets: Solid or hollow (not cellular) neoprene or PVC; light gray, minimum 40 shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.
- 2.3 FABRICATED PRODUCTS
- A. Refrigerator Hardware: Heavy duty, die cast zinc, chrome plated and polished.
 1. Hinges: Edge mounted, self-closing type.
 2. Latches: Edge mounted, arranged for locking devices.
 - B. Handles and Pulls: Provide stainless steel handles with No. 4 finish, or die cast zinc with polished chrome-plated finish. Provide die stamped stainless steel pulls, recessed rectangular type, with beveled edge frame.
 - C. Door Slides: Provide stainless steel or galvanized steel door slides with minimum load capacity of 100 pounds per pair, and with positive door stop. Provide ball bearing rollers.
 - D. Hinges: Provide stainless steel hinges, continuous type or butt type as indicated.
 - E. Sliding Door Hardware: Provide extruded aluminum door track. Provide galvanized steel door sheave with nylon surface and ball bearing inner races. Provide stainless steel bottom guide pins, spring loaded.
 - F. Adjustable Shelf Supports: Provide stainless steel shelf supports, snap in type, and stainless steel brackets with countersunk mounting holes.
 - G. Catches: For hinged doors, provide permanent magnetic catch of sufficient strength to hold door shut.

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- H. Locks: Manufacturers standard brass 5-pin cabinet type lock. Provide two keys for each lock, keyed separately.
- I. Lever Drains: Provide 2-inch, heavy cast bronze body, removable flat stainless steel strainer, twist handle waste outlet, and one piece connected chrome plated brass overflow.
- J. Casters: Provide minimum 4-inch diameter wheel casters with 1 1/8 inch tread width, complying with NSF standards. Provide sealed, self-lubricating bearings, cadmium plated or bright zinc plated steel disc wheels, and solid synthetic rubber tires. Provide foot brakes on 2 casters per unit.

2.4 FABRICATION OF EQUIPMENT

- A. The owner/food service consultant reserves the right to accept or reject any custom fabrication manufacturer that may not meet the capabilities of this project. Fabricator references from three food service consultants must be submitted prior to submitting final pricing using the proposed fabricator. The following list includes fabricators that can be considered for use and do not require pre-approval of the food service consultant:
 - 1. Keystone Custom Fabricators - Elizabeth, PA (412) 384-9131
 - 2. EMI Industries – Boonton, NJ (860) 920-7300
 - 3. Bova Corporation – Valencia, PA (724) 898-0288
 - 4. Kevry Stainless - Golden, CO (303) 271-9300
 - 5. American Stainless - Englewood, CO (303) 783-0005
- B. Tops: Fabricate of 14 gauge stainless steel, with exposed edges rolled on 1 1/2 inch diameter radius, and with corners bullnosed. Where tops are adjacent to walls or adjoining equipment, turn up ten inches and back two inches on a 45-degree angle, unless otherwise indicated.
 - 1. Backsplashes: Cove horizontal and vertical corners.
- C. Dishtables and Drainboards: Fabricate of 14 gauge stainless steel, with exposed edges formed into 1 1/2 inch by 180 degrees rolled rim, approximately 3 inches high. Provide built in pitch of 1/2-inch minimum. Provide ten inch high backsplashes with 2 inch return on 45 degree angle or 1 1/2 inch diameter rolled rim, as indicated. Construct front rim and backsplash on drainboards with continuous level plane with sink it adjoins. Support drainboards up to 36 inches in length, by 1-inch diameter stainless steel tube welded to underside of drainboard and leg gusset. Support drainboards 36 inches and longer with legs. Cove horizontal and vertical corners with not less than 3/4-inch radius.
- D. Framing: Mount tops on 4 inch wide by 14 gauge stainless steel channels.
 - 1. Run framework around entire perimeter of unit, and cross brace on centers. For dishtables and drainboards, run framing from front to back at each leg location, and run additional channel lengthwise, located at center of table width and welded to leg channels. Fasten framing to underside of top surfaces with 1/4-inch studs welded at approximately 12-inch centers. Provide each stud with suitable chrome plated lockwashers and capnuts, and make stud lengths such that capnuts can be made up tight bringing top down snugly to framing.
- E. Legs and Cross Rails: Construct legs of 1 5/8 inch OD by 16 gauge stainless steel tubing, with fully enclosed stainless steel bullet shaped adjustable foot with minimum adjustment of 1 inch up or down without any threads showing. Fasten legs to 4-inch high stainless steel gusset with top

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completely sealed by means of stainless steel plate. Weld gusset continuously to bottom of unit framing. Construct cross rails of 1 1/4 inch O.D. by 16-gauge stainless steel tubing. Weld cross rails continuously to legs, grind and polish until smooth.

- E. Drawers: Lift out type drawer body, one piece 20 inch by 20 inch by 5 inch die stamped of 18 gauge stainless steel, with inside radiused corners. Construct front of double pan stainless steel, 16-gauge exterior and 20-gauge interior. Provide lock for each drawer.
 - 1. Fasten drawer suspension guides to 16-gauge stainless steel housing suspended from angle framing under fixed top.
- F. Cabinet Bodies: Construct of 18 gauge stainless steel, with end panels formed with round corners for freestanding units, and square corners for fixtures that adjoin walls or other fixtures. Provide 90-degree retentions on end panels at front and rear, turned in toward body of cabinet and welded for reinforcement. For cabinets with open shelving, provide double wall inner panels. Weld ends to horizontal angle or channel members to form integral cabinet base. Provide backs of same material as ends, with vertical edges turned in to match edges of ends. Weld making flush joint.
- G. Inserts: Where cold pans and other inserts are to be installed in cabinet bases, provide apron full depth of insert and of same material as bodies with reinforced openings as required. Form in openings on all sides.
- H. Sliding Doors: Construct of 18 gauge stainless steel with edges formed into channel extending around all sides, forming doors 7/8 inch thick. Insert sound deadening material, and enclose with stainless steel back panel with welded corner joints.
 - 1. Mount doors on sliding door hardware.
 - 2. Construct doors so as to be removable for cleaning purposes, and provide with stops.
 - 3. Provide, on each door, recessed stainless steel pulls and locks.
- I. Hinged Doors: Construct same as sliding doors. Mount on stainless steel continuous type hinges, fitted with stainless steel pulls, magnetic catches and locks. Construct so that door face is flush with cabinet body.
- K. Shelves: Construct of 14-gauge stainless steel.
 - 1. Bottom shelves: Extend forward and turn down at front so as to be flush with front facing of cabinet.
 - 2. Fixed intermediate shelves: Weld to front stiles and to 14 gauge stainless steel brackets so that shelf is 1 inch away from back and ends of cabinet.
 - 3. Adjustable shelves: Channel on all four sides, weld corners, and mount on removable stainless steel standards.
- L. Open Base Shelving: Construct of 16 gauge stainless steel with edges rolled down on open sides, and 2 inch turn up with 3/4 inch radius on rear and ends where adjacent to walls and other equipment. Neatly notch corners and weld to legs. Reinforce shelving longitudinally with 14 gauge formed channel welded to underside. Construct removable shelves as above, but fit over cross rails. Do not exceed shelving sections of 30 inches long; where one section abuts another, turn down edges one inch.
- M. Wall Shelves: Construct of 16 gauge stainless steel with 1 1/2 inch roll on front and exposed ends, and with 2 inch turn up on back and ends where adjacent to walls or other fixtures. Weld all

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corners. Construct wall brackets of 14-gauge stainless steel with 1 1/2-inch flange at wall and completely welded to underside of shelf. Fasten each bracket to wall with minimum of two 1/2-inch bolts anchored to wall. Fasten shelf to wall bracket by means of studs welded to shelf, and secure with lockwasher and chrome plated cap nuts. Install so that shelf sets 1 1/2 inch away from the wall.

- N. Overshelves: Set shelves mounted over equipment, not adjacent to walls, on 1 inch by 14 gauge stainless steel tubular standards fitted with stainless steel base flanges. Completely weld top of tubular standards to 14-gauge stainless support channels; run channels full width of overself. Run 1/2-inch steel tension rods through counter tops and reinforcing angle framing, secure with nuts and lockwashers to assure stable sway-free structure.
 - 1. Where shelves are mounted over drainboards or dish tables, mount on upturned, rolled edges, omitting flanges, and scribe lower end of tube to match contour of roll.
- O. Sinks: Fabricate from 14 gauge stainless steel with interior corners rounded to 1 inch radius, both horizontally and vertically, forming cove in bottom. Construct with butt-edge joints, welded and ground smooth so no evidence of welding will appear. Divide multiple compartment sinks with double wall 14 gauge stainless steel partitions rounded to 1/2 inch radius on top and having corners rounded same as other corners in sinks, continuously welded in place with welds ground smooth and polished. Provide back, bottom and front of one continuous piece with no overlapping joints or open spaces between compartments. Pitch bottom of each compartment and crease to die stamped recess to receive lever type drain, without use of solder, rivets or welding.
 - 1. Finish front and exposed ends of sink with 1 1/2 inch 180 degree rolled edge. Finish back and ends adjacent to walls or other fixtures with splash back. Punch back splash back to receive wall mounted faucets.
 - 2. For sinks in worktops, construct as above, but omit roll edges with splash backs. Fabricate bowl so as to be flush with work surfaces.
- P. Cold Pans: Fabricate with 14-gauge stainless steel lining and 20 gauge stainless steel casing. Cove interior horizontal and vertical corners. Insulate sides, ends and bottom with material thermally equal to 2-inch thickness of fiberglass. Sweat 1/2-inch diameter copper cooling coils to underside of cold pan, and seal in thermostatic material. Turn down countertop 1 inch into pan. Install completely concealed 1-inch wide plastic breaker strip. Install 1-inch chrome plated drain with plug. Provide 1/2 inch high false bottom of 14 gauge perforated stainless steel in removable sections.

2.5 EXHAUST HOOD FABRICATION

- A. Comply with NFPA 96, including appendix A.
- B. Grease Removal: Provide grease removal devices as called for in the itemized on the manufacturer's provided cutsheet and engineering data.
- C. Light Fixtures: Provide light fixtures as called for on the manufacturer's engineering drawings.

3. EXECUTION

3.1 INSPECTION

- A. Rough In Work: Examine roughed in mechanical and electrical services, installation of floors, walls, columns and ceilings, and other conditions under which food service work is to be installed; verify dimensions of services and substrates before fabricating work. Notify contractor of unsatisfactory locations and dimensions of other work and of unsatisfactory conditions for proper installation of food service equipment. Do not proceed with fabrication and installation until unsatisfactory dimensions and conditions have been corrected in a manner satisfactory to installer.

3.2 INSTALLATION

- A. Install all equipment, including any existing reused items, per manufacturer's recommendations.
- B. Set each item of non-mobile and non-portable equipment securely in place, level and adjust to correct height. Anchor to supporting substrate where indicated and where required for sustained operation and use without shifting or dislocating. Conceal anchorages where possible. Adjust countertops and other work surfaces to level tolerance of 1/16-inch maximum offset, and maximum variation from level or indicated slope of 1/16 inch per foot.
 - 1. Where indicated or required for safety of equipment operator, anchor equipment to floor or wall. Where equipment is indicated to be anchored to floor, provide legs with adjustable flanged foot. Install 2 anchors on each foot.
- C. Field Joints: Complete field assembly joints in work (joints cannot be completed in shop) by welding, bolting and gasketing, or similar methods as indicated. Grind welds smooth and restore finish. Set or trim gaskets flush, except for "T" gaskets as indicated.
- D. Enclosed Spaces: Treat spaces that are inaccessible, after equipment installation, by covering horizontal surfaces with powdered borax at the rate of 4 ounces per square foot.
- E. Closure Plates and Strips: Install where required with joints coordinated with units of equipment.
- F. Cutouts: Provide cutouts in food service equipment where required to run plumbing, electric, gas or steam lines through equipment items for final connection.
- G. Sealants and Gaskets: Install all around each unit to make joints airtight, water tight, Vermin proof and sanitary for cleaning purposes. In general, make sealed joints not less than 1/8 inch wide, and stuff backer rod to shape sealant bead properly at 1/4-inch depth. Shape exposed surfaces of sealant slightly concave with edges flush with faces of materials at joint. At internal corner joints, apply sealant or gaskets to form a sanitary cove of not less than 3/8-inch radius. Provide sealant filled or gasketed joints up to 3/4-inch joint width; metal closure strips for wider joints, with sealant application each side of strips. Anchor gaskets mechanically or with adhesives to prevent displacement.

3.3 FIELD QUALITY CONTROL

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- A. Testing: Coordinate start up of food service equipment when service lines have been tested, balanced and adjusted for pressure, voltage and similar considerations. Do not operate steam lines until they have been cleaned and treated for sanitation. Before testing, lubricate each equipment item in accordance with manufacturers' recommendations.
 - 1. Test each item of operational equipment to demonstrate that it is operating properly and that controls and safety devices are functioning. Repair or replace equipment found to be defective in its operation, including units that are below capacity or operating with excessive noise or vibration.

3.4 CLEANING

- A. After completion of installation and other major work in food service areas, remove protective coverings, if any, and clean food service equipment, internally and externally. Restore exposed and semi-exposed finishes to remove abrasions and other damages; polish exposed metal surfaces and touch up painted surfaces. Replace work that cannot be successfully restored.
 - 1. Prior to date of substantial completion on food service equipment work, buff exposed stainless steel finishes lightly using power buffer and polishing rouge or grit of No. 400 or finer.
- B. Final Cleaning: After testing and start up, but before time of substantial completion, clean and sanitize food service equipment and leave in condition ready for food service.

3.5 CLOSEOUT PROCEDURES

- A. Provide services of installer's technical representative and manufacturers technical representative where required, to instruct owner's personnel in operation and maintenance of food service equipment.
 - 1. Schedule training with owner; provide at least 7 day notice to contractor and architect of training date

END 114000

DIVISION 12 - FURNISHINGS
Section 12 24 13 - Roller Window Shades

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Manually operated roller shades with single rollers.
 - 2. Motor-operated roller shades with single rollers.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Product certificates.
- B. Product test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.3 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Products: Subject to compliance with requirements, provide one of the following:

1. Draper Inc.
 2. Hunter Douglas Contract.
 3. Lutron Electronics Co., Inc.
 4. MechoShade Systems, Inc
 5. Silent Gliss Inc.
 6. Springs Window Fashions; SWFcontract
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
1. Chain-Retainer Type: Clip, jamb mount.
 2. Spring Lift-Assist Mechanisms: Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
1. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- F. Shadebands:
1. Shadeband Material: As indicated on Drawings, or if not indicated, as directed by Architect.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range
- G. Installation Accessories:
1. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
 2. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
 3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.4 MOTOR-OPERATED, SINGLE-ROLLER SHADES

- A. Products: Subject to compliance with requirements, provide one of the following:
1. Draper Inc.
 2. Hunter Douglas Contract.
 3. Lutron Electronics Co., Inc.

4. MechoShade Systems, Inc
 5. Silent Gliss Inc.
 6. Springs Window Fashions; SWFcontract
- B. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Electric Motor: Manufacturer's standard tubular, enclosed in roller.
 3. Remote Control: Individual/group wall-switch control station, unless directed otherwise by Architect.
 4. Crank-Operator Override: Crank and gearbox operate shades in event of power outage or motor failure.
 5. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
1. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers that are operated by one roller drive-end assembly.
- F. Shadebands:
1. Shadeband Material: As indicated on Drawings, or if not indicated, as directed by Architect.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- G. Installation Accessories:
1. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
 2. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
 3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.5 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
 - 1. Source: Roller shade manufacturer.
 - 2. Orientation on Shadeband: Up the bolt.
 - 3. Color: As selected by Architect from manufacturer's full range.
- C. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.
 - 1. Source: Roller shade manufacturer.
 - 2. Orientation on Shadeband: Up the bolt.
 - 3. Color: As selected by Architect from manufacturer's full range.

2.6 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
 - 2. At Locations Indicated, Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 - 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

END 12 24 13

DIVISION 12 - FURNISHINGS
Section 12 32 13 - Manufactured Wood-Veneer-Faced Casework

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Wood-veneer-faced casework.
 - 2. Casework hardware and accessories.

1.3 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.4 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Quality Standard Compliance Certificates.
- B. Sample warranty.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CampbellRhea.
 - 2. Kewaunee Scientific Corporation.
 - 3. Mid Canada Millwork Ltd.
 - 4. Terrill Manufacturing Company.
 - 5. R. C. Smith Company.
 - 6. Windham Millwork, Inc.

2.3 GENERAL REQUIREMENTS FOR CASEWORK

- A. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WT's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
 - 1. Grade: Custom.
- B. Product Designations by Manufacturer Reference: Drawings indicate sizes, configurations, and finish materials of manufactured wood-veneer-faced casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 01 60 00 "Product Requirements."

2.4 WOOD-VENEER-FACED CABINETS

- A. Design: Face-frame cabinet construction with the following door and drawer-front style:
 - 1. Flush overlay.
- B. Wood Species: As indicated on Drawings, or if not indicated, as directed by Architect.
 - 1. Wood Stain Colors and Finishes: As selected by Architect from casework manufacturer's full range.
- C. Face Veneer Cut: Plain sliced, unless directed otherwise.
- D. Grain Direction:
 - 1. Doors: Vertical with continuous vertical matching.
 - 2. Drawer Fronts: Vertical with continuous vertical matching.
 - 3. Face Frame Members: Lengthwise.
 - 4. End Panels: Vertical.
 - 5. Bottoms and Tops of Units: Side to side.
 - 6. Knee Space Panels: Vertical.
 - 7. Aprons: Horizontal.
- E. Exposed Materials:
 - 1. Plywood: Hardwood plywood with face veneer of species indicated, selected for compatible color and grain. Provide backs of same species as faces.
 - 2. Solid Wood: Clear hardwood lumber of species indicated and selected for grain and color compatible with exposed plywood.
 - 3. Edgebanding: Wood veneer of same species as face veneer.
 - a. PVC Edgebanding Color: Casework manufacturer's standard.
- F. Semiexposed Materials:

1. Thermoset Decorative Panels: Provide thermoset decorative panels for semiexposed surfaces, except provide solid wood or hardwood plywood for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.
 - a. Colors and Patterns: As selected by Architect from manufacturer's full range.
2. Hardboard: Use only for cabinet backs where exterior side of back is not exposed.
3. Metal for Steel Drawer Pans: Cold-rolled, carbon-steel sheet complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.

G. Concealed Materials:

1. Solid Wood: With no defects affecting strength or utility.
2. Plywood: Hardwood plywood. Provide backs of same species as faces.
3. Particleboard.
4. MDF.
5. Hardboard.

2.5 MATERIALS

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: ANSI A208.1, Grade M-2.
- E. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.
- F. Hardboard: ANSI A135.4, Class 1 tempered.
- G. PVC Edgebanding for Wood: Rigid PVC extrusions, through color with satin finish, 0.12 inch thick at doors and drawer fronts, 0.04 inch thick elsewhere.
- H. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
 1. Edgebanding for Thermoset Decorative Panels: PVC or polyester edgebanding matching thermoset decorative panels.
- I. Tempered Glass for Glazed Doors: Clear tempered glass complying with ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; not less than 5.0 mm thick.

2.6 FINISH

- A. Stain: Provide uniform color and to match approved Samples.
- B. Finish: Manufacturer's standard, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish.

2.7 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
 - 1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, Type B01602.
- C. Wire Pulls: Solid stainless-steel or chrome-plated brass wire pulls, fastened from back with two screws.
 - 1. For sliding doors, provide recessed stainless-steel or chrome-plated flush pulls.
- D. Semirecessed Pulls: Plastic. For sliding doors, provide recessed plastic flush-pulls.
- E. Door Catches: Zinc-plated, nylon-roller spring catch or dual, self-aligning, permanent magnet catch.
- F. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
- G. Drawer Slides: BHMA A156.9, Type B05091.
- H. Drawer and Hinged-Door Locks: Cylindrical (cam) or Mortise type, five-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
 - 1. Provide a minimum of two keys per lock and six master keys.
 - 2. Provide locks where indicated.
 - a. Masterkey for up to 500 key changes.
- I. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door unit.
- J. Adjustable Shelf Supports: Two-pin-locking plastic shelf rests complying with BHMA A156.9, Type B04013.

END 12 32 13

DIVISION 12 - FURNISHINGS
Section 12 32 16 - Manufactured Plastic-Laminate-Clad Casework

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Plastic-laminate-clad casework.
 - 2. Casework hardware and accessories.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Sample warranty.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advanced Cabinet Systems (ACS).
 - 2. Cal-Dak Cabinets.
 - 3. Case Systems Inc.
 - 4. Hausmann Industries, Inc.
 - 5. Mid Canada Millwork Ltd.

2.3 GENERAL REQUIREMENTS FOR CASEWORK

- A. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WT's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.

1. Grade: Custom.

2.4 PLASTIC-LAMINATED-FACED CABINETS

- A. Design: Frameless cabinet construction with the following door and drawer-front style:

1. Flush overlay.

- B. Grain Direction for Wood-Grain Plastic Laminate:

1. Doors: Vertical with continuous vertical matching.
2. Drawer Fronts: Vertical with continuous vertical matching.
3. Face Frame Members: Lengthwise.
4. End Panels: Vertical.
5. Bottoms and Tops of Units: Side to side.
6. Knee Space Panels: Vertical.
7. Aprons: Horizontal.

- C. Exposed Materials:

1. Plastic-Laminate Grade: HGS.
 - a. Colors and Patterns: As selected by Architect from manufacturer's full range.
2. Edgebanding: Plastic laminate matching adjacent surfaces.

- D. Semiexposed Materials:

1. Thermoset Decorative Panels: Provide thermoset decorative panels for semiexposed surfaces unless otherwise indicated.
 - a. Colors and Patterns: As selected by Architect from manufacturer's full range.
 - b. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.
2. Unless otherwise indicated, provide specified edgebanding on all semiexposed edges.

- E. Concealed Materials:

1. Solid Wood: With no defects affecting strength or utility.
2. Plywood: Hardwood plywood.
3. Plastic Laminate: Grade BKL.
4. Particleboard.
5. MDF.

2.5 MATERIALS

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: ANSI A208.1, Grade M-2.
- E. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.
- F. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
 - 1. Products and Manufacturers: Subject to compliance with requirements, provide plastic laminate materials matching Architect's samples, which have been selected from the product lines and manufacturers indicated in Finish Schedule on Drawings, or comparable products as approved by Architect.
- G. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.6 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
 - 1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, Type B01602.
- C. Wire Pulls: Solid stainless-steel or chrome-plated brass wire pulls, fastened from back with two screws.
 - 1. For sliding doors, provide recessed stainless-steel or chrome-plated flush pulls.
- D. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
- E. Drawer Slides: BHMA A156.9, Type B05091.
- F. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
 - 1. Provide a minimum of two keys per lock and six master keys.
 - 2. Provide locks where indicated.
- G. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door unit.

- H. Adjustable Shelf Supports: Single-pin metal shelf rests complying with BHMA A156.9, Type B04013.

END 12 32 16

1. GENERAL

- A. Base Bid: General Contractor to provide the following:

1. Kitchen and vanity cabinets.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- A. Product Certificates.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Armstrong Cabinet.
 2. Cabinet Craft LLC.
 3. Kitchen Craft Cabinetry.
 4. Merillat Industries, Inc.
- B. Quality Standard: Provide cabinets that comply with KCMA A161.1.
 1. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semiexposed location of each unit and showing compliance with KCMA A161.1.
- C. Door and Drawer Face Style: Flush overlay.
 1. Door and Drawer Fronts: 1/2-inch-thick, veneer-faced plywood.

- D. Cabinet Style: Frameless.
- E. Exposed Cabinet End Finish: Wood veneer.

2.3 CABINET MATERIALS

- A. Hardwood Lumber: Kiln dried to 7 percent moisture content.
- B. Softwood Lumber: Kiln dried to 10 percent moisture content.
- C. Hardwood Plywood: HPVA HP-1.
- D. Particleboard: ANSI A208.1, Grade M-2.
- E. MDF: Medium-density fiberboard, ANSI A208.2, Grade MD.
- F. Hardboard: ANSI A135.4, Class 1 tempered.
- G. Exposed Materials:
 - 1. Exposed Wood Species: Match Architect's sample.
 - a. Select materials for compatible color and grain. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
 - b. Staining and Finish: Match Architect's sample.
 - 2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
 - 3. Plywood: Hardwood plywood with face veneer of species indicated, with Grade A faces and Grade C backs of same species as faces.
- H. Semiexposed Materials: Unless otherwise indicated, provide the following:
 - 1. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper.
 - a. Provide material finished on both sides for shelves, dividers, drawer bodies, and other components with two semiexposed surfaces.
 - b. Provide PVC or polyester edgebanding on components with semiexposed edges.
 - c. Colors: As selected by Architect from cabinet manufacturer's full range.
- I. Concealed Materials: Solid wood or plywood, of any hardwood or softwood species, with no defects affecting strength or utility; particleboard; MDF; or hardboard.

2.4 CABINET HARDWARE

- A. General: Manufacturer's standard units complying with BHMA A156.9, of type, size, style, material, and finish matching Architect's sample.
- B. Pulls: Wire pulls.

- C. Hinges: Concealed European-style, self-closing hinges.
- D. Drawer Guides: Epoxy-coated-metal, self-closing drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05011 or Type B05091.
- E. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
 - 1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.
 - 2. Drawers: Provide one bumper on back side of drawer front at each corner.

END 12 35 30

DIVISION 12 - FURNISHINGS
Section 12 36 23.13 - Plastic-Laminate-Clad Countertops

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Plastic-laminate-clad countertops.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Product Certificates.
- C. Quality Standard Compliance Certificates.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops 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 countertops comply with requirements of grades specified.
- B. Grade: Custom.
- C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Lamin-Art, Inc.
 - c. Wilsonart LLC.
 - D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 1. As selected by Architect from manufacturer's full range.
 - E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
 - F. Core Material: Particleboard or MDF.
 - G. Core Material at Sinks: Particleboard made with exterior glue, MDF made with exterior glue, or exterior-grade plywood.
 - H. Core Thickness: 3/4 inch.
 1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
 - I. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.
 - J. Paper Backing: Provide paper backing on underside of countertop substrate.
- 2.3 WOOD MATERIALS
- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
 - B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
 1. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.
 2. Particleboard: ANSI A208.1, Grade M-2.
 3. Softwood Plywood: DOC PS 1.
- 2.4 MISCELLANEOUS MATERIALS
- A. Adhesive for Bonding Plastic Laminate: As selected by fabricator to comply with requirements.
 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
- B. Complete fabrication, including assembly, 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.

END 12 36 23.13

DIVISION 12 – FURNISHINGS
Section 12 36 61.16 – Solid Surfacing Countertops

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Solid surface material countertops.
 - 2. Solid surface material backsplashes.
 - 3. Solid surface material sinks.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avonite Surfaces.
 - b. E. I. du Pont de Nemours and Company.
 - c. Formica Corporation.
 - d. LG Chemical, Ltd.
 - e. Samsung Chemical USA, Inc.
 - f. Wilsonart LLC.
 - 2. Type: Provide Standard type unless Special Purpose type is indicated.
 - 3. Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.

DIVISION 12 – FURNISHINGS
Section 12 36 61.16 – Solid Surfacing Countertops

- 4. Colors and Patterns: As selected by Architect from manufacturer's full range.
- B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.3 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WT's "Architectural Woodwork Standards."
 - 1. Grade: Custom.
- B. Configuration:
 - 1. Front: As indicated.
 - 2. Backsplash: As indicated.
- C. Countertops: 1/2-inch-thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch-thick, solid surface material.
- E. Joints: Fabricate countertops without joints.
- F. Cutouts and Holes:
 - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

2.4 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

END 12 36 61.16

DIVISION 12 – FURNISHINGS
Section 12 36 61.19 – Quartz Agglomerate Countertops

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Quartz agglomerate countertops.
 - 2. Quartz agglomerate backsplashes.
 - 3. Quartz agglomerate apron fronts.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

- A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Caesarstone International.
 - b. E. I. du Pont de Nemours and Company.
 - c. LG Chemical, Ltd.
 - d. Meganite Inc.
 - e. Samsung Chemical USA, Inc.
 - f. Technistone USA, Inc.
 - g. Wilsonart LLC.

2. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.3 COUNTERTOP FABRICATION

- A. Fabricate countertops according to quartz agglomerate manufacturer's written instructions and the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 1. Grade: Custom.
- B. Configuration:
 1. Front: Straight, slightly eased at top with separate apron, 6 inches high, recessed 1/4-inch behind front edge.
 2. Backsplash: Straight, slightly eased at corner.
 3. End Splash: None.
- C. Countertops: 1/2-inch- thick, quartz agglomerate with front edge built up with same material.
- D. Backsplashes: 1/2-inch- thick, quartz agglomerate.
- E. Joints: Fabricate countertops in sections for joining in field.
 1. Joint Locations: Not within **18 inches** of a sink or cooktop and not where a countertop section less than **36 inches** long would result, unless unavoidable.
- F. Cutouts and Holes:
 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
 4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.4 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by quartz agglomerate manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

END 12 36 61.19

DIVISION 12 - FURNISHINGS
Section 124813 - Entrance Floor Mats and Frames

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Resilient entrance mats.
 - 2. Recessed frames.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 ENTRANCE FLOOR MATS AND FRAMES, GENERAL

- A. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 RESILIENT ENTRANCE MATS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Babcock-Davis.
 - 2. C/S Group.
 - 3. JL Industries, Inc.; a division of the Activar Construction Products Group.

- B. Carpet-Type Mats: Nylon, polypropylene, olefin, polyester carpet bonded to 1/8- to 1/4-inch-thick, flexible vinyl backing to form mats 3/8 or 7/16 inch thick with nonraveling edges.
 - 1. Colors, Textures, and Patterns: As selected by Architect from full range of industry colors.
 - 2. Mat Size: As indicated.
- C. Graphics: Custom inlaid or woven-in graphic design, logo, emblem, characters, as indicated.

2.4 FRAMES

- A. Recessed Frames: ASTM B 221. Manufacturer's standard extrusion.

2.5 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.
- B. Coat concealed surfaces of aluminum frames that contact cementitious material with manufacturer's standard protective coating.

END 12 48 13

DIVISION 14 -CONVEYING SYSTEMS
Section 14 21 00 - Electric Traction Elevators

PART 1 - GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Electric traction elevators.

1.2 ACTION SUBMITTALS

- A. Submittals: Shop Drawings and Samples of exposed finishes.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

PART 2 - PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- B. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. KONE Inc.
 - 2. Otis Elevator Co.
 - 3. Schindler Elevator Corp.
 - 4. ThyssenKrupp Elevator.

2.3 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with requirements for elevators in ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in ICC A117.1.
- C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator seismic requirements in ASME A17.1/CSA B44.

1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
2. Project Seismic Design Category: [C] [D] [E] [F].
3. Elevator Importance Factor: 1.0.
4. Design earthquake spectral response acceleration short period (Sds) for Project is <Insert value>.
5. Provide earthquake equipment required by ASME A17.1/CSA B44.

2.4 MATERIALS AND COMPONENTS

A. Machine Type: Gearless traction.

1. At manufacturer's option, provide variable-voltage, variable-frequency, ac-type or variable-voltage, dc-type hoisting machines. Provide solid-state power converters.

B. Furnish required concrete and masonry inserts. Installation is specified in other Specification Sections.

2.5 FINISH MATERIALS

A. Steel Sheet: Cold-rolled steel sheet, ASTM A 1008/A 1008M, exposed, matte finish, except that hot-rolled steel sheet, ASTM A 1011/A 1011M may be used for door frames.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

C. Stainless-Steel Bars: ASTM A 276, Type 304.

D. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.

E. Aluminum Extrusions: ASTM B 221, Alloy 6063.

F. Plastic Laminate: High-pressure type complying with NEMA LD 3.

2.6 CAR ENCLOSURES AND ENTRANCES

A. General: Provide steel-framed car enclosures with wall panels, car roof, access doors, and ventilation.

B. Long Term Care Elevators: Electrical traction passenger/service elevators will provide access to all levels within the building. Minimum capacity of elevators to be 3,000 lbs, each with front and rear opening doors.

2.7 SIGNAL EQUIPMENT

A. Illuminated hall-call and car-call buttons.

- B. Except for buttons and illuminated elements, fabricate car and hall fixtures from satin stainless-steel, No. 4 finish.
- C. Manufacturer's standard car control station. Mount in side panel adjacent to car door.
- D. Emergency Communication System: Two-way voice communication system, with visible signal, that dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- E. Car position indicator above the car door or above the car control station. Also provide audible signal to indicate that car is either stopping at or passing the floor. Include direction arrows if not provided in car control station.
- F. Hall Push-Button Stations: Provide one hall push-button station at each landing.
- G. Hall lanterns with illuminated arrows.
- H. Hall Annunciator: With each lantern, provide audible signals. At manufacturer's option, audible signal may be placed on car.
- I. Hall position indicator above hoistway entrance at ground floor.

END 14 21 33.

DIVISION 14 -CONVEYING SYSTEMS

Section 14 24 00 - Hydraulic Elevators

PART 1 - GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:
 - 1. Hydraulic elevators.

1.2 ACTION SUBMITTALS

- A. Submittals: Shop Drawings and Samples of exposed finishes.

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.

PART 2 - PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- B. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. KONE Inc.
 - 2. Otis Elevator Co.
 - 3. Schindler Elevator Corp.
 - 4. ThyssenKrupp Elevator.

2.3 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

- C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator seismic requirements in ASME A17.1/CSA B44.
1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 2. Project Seismic Design Category: [C] [D] [E] [F].
 3. Elevator Component Importance Factor: [1.5] [1.0].
 4. Design earthquake spectral response acceleration short period (Sds) for Project is <Insert value>.
 5. Provide earthquake equipment required by ASME A17.1/CSA B44.

2.4 ELEVATORS

- A. Domiciliary: Hydraulic passenger/service elevators will provide access to all levels within the building. Minimum capacity of elevators to be 3,000 lbs., each.
- B. Multi-Therapy Tower Connection: Hydraulic passenger/service elevators will provide access to all levels within the building. Minimum capacity of elevators to be 3,000 lbs., each with front and rear opening doors.

2.5 SYSTEMS AND COMPONENTS

- A. Electric Pump-Tank-Control System Equipment in Machine Room:
1. Positive-displacement pump, submersible type or mounted on tank with vibration isolators, with a maximum of 10 percent variation between no load and full load.
 2. Squirrel-cage induction motor with variable-voltage, variable-frequency motor control.
 3. Flexible connectors in piping and hydraulic silencer at pump unit.
- B. Furnish required concrete and masonry inserts. Installation is specified in other Specification Sections.
- C. Door Reopening Devices, Infrared Array: Uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams causes doors to stop and reopen.

2.6 CAR ENCLOSURES AND ENTRANCES

- A. Car Enclosures: Provide enameled-steel car enclosures to receive removable wall panels, with car roof, access doors, power door operators, and ventilation. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Hoistway Entrances: Manufacturer's standard hollow-metal, sliding, door-and-frame entrances.
1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.

2.7 SIGNAL EQUIPMENT

- A. Illuminated hall-call and car-call buttons.
- B. Except for buttons and illuminated elements, fabricate car and hall fixtures from satin stainless-steel, No. 4 finish.
- C. Manufacturer's standard car control station in each car. Mount in return panel adjacent to car door unless otherwise indicated.
 - 1. Mount controls to comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
- D. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- E. Car position indicator above the car door or above the car control station. Also provide audible signal to indicate that car is either stopping at or passing the floor. Include direction arrows if not provided in car control station.
- F. Hall Push-Button Stations: Provide one hall push-button station at each landing.
- G. Hall lanterns with illuminated arrows.
 - 1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
- H. Hall Annunciator: With each lantern, provide audible signals. At manufacturer's option, audible signal may be placed on car.
- I. Hall position indicator above each hoistway entrance at ground floor.
- J. Corridor Call Station Pictograph Signs: Provide signs with text and graphics as required by authorities having jurisdiction, indicating that in case of fire elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

2.8 FINISH MATERIALS

- A. Steel Sheet: Cold-rolled steel sheet, ASTM A 1008/A 1008M, exposed, matte finish, except that hot-rolled steel sheet, ASTM A 1011/A 1011M may be used for door frames.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- C. Stainless-Steel Bars: ASTM A 276, Type 304.
- D. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.
- E. Aluminum Extrusions: ASTM B 221, Alloy 6063.

F. Plastic Laminate: High-pressure type complying with NEMA LD 3.

END 14 24 00.

DIVISION 14 -CONVEYING SYSTEMS

Section 14 91 82 - Trash Chutes

1. GENERAL

1.1 SUMMARY

- A. Base Bid: General Contractor to provide the following:

- 1. Waste chutes.

1.2 ACTION SUBMITTALS

- A. Product Data.
- B. Shop Drawings

1.3 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittal Requirements: See Section 01 81 13 "Sustainable Design Requirements" for submittal requirements.
- B. Coordination Drawings.
- C. Product Certificates.
- D. Field quality control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

2. PRODUCTS

2.1 SUSTAINABLE DESIGN MATERIAL REQUIREMENTS

- A. Materials shall comply with the requirements of Section 01 81 13 "Sustainable Design Requirements."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Chute Systems, Inc.
 - 2. Chutes International.
 - 3. Midland Chutes.
 - 4. U.S. Chutes; U.S.C. Group.

2.3 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: Comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design, the Illinois Accessibility Code (IAC), and Chapter 18-11 of the Chicago Building Code, including ICC/ANSI A117.1.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing and inspecting agency, for fire-protection ratings indicated.
 - 1. Test Pressure: Test at atmospheric (neutral) pressure according to NFPA 252 or UL 10B.
 - 2. Intake Doors: Labeled, 1-1/2-hour fire-resistance rated.
 - 3. Access Doors: Labeled, 1-1/2-hour fire-resistance rated.
- C. Discharge-Door Assemblies: Labeled, 1-1/2-hour fire-resistance rated according to NFPA 252 or UL 10B requirements for fire-rated door assemblies.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Standard: Provide chutes complying with NFPA 82.
- F. Chute Diameter: 28 inches, unless otherwise indicated.

2.4 ACCESSORIES

- A. Chute Fire Sprinklers: NFPA 13; manufacturer's standard, recessed, automatic, NPS 1/2 sprinklers; ready for piping connections.
- B. Flushing Spray Unit: NPS 3/4 spray-head unit located in chute above highest intake door, ready for hot-water piping connection, and with access door for spray-head and piping maintenance.
- C. Sanitizing Unit: NPS 3/4 disinfecting and sanitizing spray-head unit located in chute above highest intake door, including 1-gal tank and adjustable proportioning valve with bypass for manual control of sanitizing and flushing operation, ready for hot-water piping connection, and with access door for spray-head and piping maintenance.
- D. Intake-Door Baffles: Rubber baffles, 1/8 inch thick.

2.5 FABRICATION

- A. Factory-assemble chutes to greatest extent practicable.
- B. Roof Vent: Extend vent to height above roofing surface as indicated on Drawings. Equip vent with full insect screening and metal explosion-release cap. Fabricate with roof-deck flange, counterflashing, and clamping ring of nonferrous metal compatible with chute metal.
- C. Chute Fire Sprinklers: Install internally within chute, recessed out of the chute area through which material travels, and according to NFPA 13.

- D. Equipment Access: Fabricate chutes with access for maintaining equipment located within the chute, such as flushing and sanitizing units, fire sprinklers, and plumbing and electrical connections.

END 14 91 82.