BD2016-00431

County of San Mateo
Serenity House

3701 Hacienda Street
San Mateo, CA 94403

JOB COPY
TO REMAIN ON
SITE AT ALL TIMES

Project Manual

Construction Documents and reference materials for
Remodel of existing county facilities
Construction Document Bid Set
Volume 2

APPROVED PLAN
SEP 30 2016
BY
SAN MATEO COUNTY BUILDING
INSPECTION DIVISION

REVISION
SEP 06 2016
San Mateo County
Building Inspection

HGA
Architecture | Engineering | Planning

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CIVIL

LANDSCAPE

ARCHITECTURAL

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1.1 SUMMARY (011100)

A. General Scope: Project consists of a renovation of 3701 Hacienda Street, San Mateo to a behavioral health facility that will include: demolition, new construction remodeling and exterior work for General Construction, Site, Civil and Landscaping, Utilities and Mechanical, Electrical and Plumbing as described within the scope of the Contract Documents.

1. Work Included. Provide labor, materials, articles, equipment, incidentals, items, tools, services, supplies, methods, operations, skills in such quantities as may be necessary to complete Project within intent of the Contract Documents.
2. Construction Limits. Except as specifically indicated or as may be necessary to complete the work under the contract, activities of the contract shall be limited to within the limits designated on drawings.

B. Construction Contract: Construction will be accomplished under a single Prime Contract including General Construction, Mechanical, Plumbing and Electrical work.

1. Design-Bid-Build Services for Mechanical, Plumbing and Electrical Work: Contractor will design, coordinate, and construct all mechanical, plumbing, and electrical Work as part of this Contract.
2. Provide and pay for all bonds, that may be required, including bonds, permits and fees required by municipalities, including connecting fees, to directly accomplish the work under this project.
   a. Performance/Payment Bond. The Owner reserves the right at any time to require a bond in accordance with General Conditions.
      1) Provide on Form AIA A311.
      2) Provide on Miller/Davis Bond Form.
      3) Pay for bond.
3. Do not award work to Subcontractor without prior approval of Owner and Architect. Approval will not be given until Contractor submits List of Subcontractors containing such information as Owner and Architect may require concerning the proposed Subcontractor and scope of subcontract.

C. Specification and Drawing Conventions:
   1. Drawings and specifications are intended to provide the basis for the proper completion of t Project suitable for the intended use of the Owner. Items not expressly set forth but which are reasonably implied or necessary for the proper performance of this work shall be included.
   2. Singular notations shall be considered plural where plural application is reasonably inferable. Mention or indication of extent of work under work division or specification section is done only for convenience of Contractor and shall not be construed as describing all work required under that Division or Section.

1.2 WORK RESTRICTIONS (011400)

A. It is essential that full Owner's services and functions are maintained throughout construction period, with minimum disturbance and disruption to operations.
   1. Contractor, subcontractors and workers shall be aware of these requirements and objectives.
   2. Conduct work and develop detailed schedule to meet these requirements and objectives.
   3. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
   4. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's operations.

B. Keep Owner advised of intended operations and schedule and be guided by other constraints or timing of work that may develop during construction, as instructed by Owner.
   1. It shall be recognized that unanticipated difficulties may arise, unanticipated conflicts in timing may occur or that Contractor will be able to develop alternatives which will benefit Project, timing of Work or Owner.In such event, propose or develop with Owner, alternatives for acceptance by Owner in advance, which will improve Project and its progress.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

D. Exercise care to prevent interruption of existing services. Utilities or other services which are shown, or not shown but encountered or otherwise found, shall be protected from any damage from work and operations of this Contract, unless or until they are abandoned.
   1. Verify location of utilities and existing conditions. Notify Architect of conditions differing from those indicated on the Drawings.
   2. If the utilities or services are not abandoned, or to be abandoned, immediately restore any damage from work or operations to place the utilities and service in an equal or better condition to that which existed.
   3. Where utilities or services are shown to be abandoned or moved, they shall remain in service, and be protected by the Contractor, until new utilities and services have been provided, tested and are ready for use.

E. Work Over Finished Floors: Where work is performed over finished floors (i.e. ceramic tile, concrete, VCT) or where the area is used as a passage, provide hardboard or plywood cover to protect against damage or stains. Covering to be provided by Contractor.

F. Working Hours: Work done outside of normal work hours, **7:00 am** to **5:00 pm** shall be authorized by the Owner.
   1. Coordinate with Owner for scheduling of work to allow for continuous access for building tenants and their customers.

G. Site Storage: Cooperate and coordinate use of available areas effectively and within sequence of Work. Owner will establish and govern use of the available space, with consideration to the needs of the subcontractors to work effectively on the site.

1.3 CONTRACT MODIFICATION PROCEDURES (012600)

A. Architect will issue through Construction Manager supplemental instructions authorizing Mir Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time AIA Document G710.

B. Owner-Initiated Proposal Requests: The Architect and Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

C. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change through the Construction Manager to the Architect.

D. Construction Change Directive (CCD): Refer to Construction Manager's Supplementary Special Conditions.

1.4 PAYMENT PROCEDURES (012900)

A. Submittals:
   1. Periodic Application/Request for Payment: Submit 3 copies to Architect.
   2. Submit 2 copies of the Periodic Payment Estimate.
   3. Submit revised Progress Schedule, Reports, Payments, with each Application for Payment as specified.
   4. Submit Schedule of Values to Architect at earliest possible date but no later than 7 days before date scheduled for submittal of initial Applications for Payment.

B. Schedule of Values:
   1. Coordinate preparation of Schedule of Values with preparation of Contractor's Construction Schedule.
   2. Correlate line items in Schedule of Values with other required administrative forms and schedules.
   3. Schedule Updating: Update and resubmit Schedule of Values before next Application for Payment when Change Orders or Construction Change Directives result in change in Contract Sum.

C. Progress Payments:
   1. Refer to General Conditions.
   2. Architect will provide forms for Periodic Application/Request for Payment. Submit 3 copies to Architect in time to be reviewed a minimum of 10 days prior to last day of the month. A schedule will be developed with the Contractor as job commences to minimize delays in payment.
   3. The amount that will be retained will be 10 percent of the value of satisfactorily complete work and site stored materials until the Work of the Contract is fully complete.
   4. Periodic Payment Estimate: Refer to General Conditions. Estimates will be required. Provide prior to first Request for Payment.

D. Completion of Work:
   1. Remaining retained percentage may be requested after Final Completion of the Work of the Contract when the Work is fully complete and acceptable to Architect and Owner.
   2. Final Payment: Final payment will be made within 60 days of approved Application for Payment.
   3. In event of a very minor amount of work incomplete or not corrected due to weather, unsuitable conditions for testing or similar conditions preventing Contractor from proceeding, retained amount may be reduced to three times the value of incomplete work upon recommendation of Architect and approval of Owner.

1.5 PROJECT MANAGEMENT AND COORDINATION (013100)

A. The Prime Contractor shall be Project Coordinator and shall coordinate and schedule all work, including with the Owner where the work of the Contract may involve or disrupt the Owner's normal functions.

B. Contractor is responsible for scheduling of pre-construction meetings and progress meetings.

C. Contractor is responsible for coordination of all trades, including General, Mechanical, Fire Protection, Plumbing, Ceiling and Electrical Subcontractors.

1. Each of these Subcontractors shall be responsible to ensure that all relevant mechanical & electrical equipment, piping, conduit, ceiling hangers, etc., is shown and will fit.
2. Each Subcontractor must include all necessary items, i.e., lights, ducts, fans, pumps, piping, conduit, etc.
3. Conflicts shall be resolved by the Contractor. Contractor is the primary source responsible for conflict resolution.

D. Schedule Coordination: Special coordination and cooperation efforts are required for certain interrelated phases of the work, such as:
1. Sequencing of **remodeling** work.
2. Removals and relocations of **existing** services and facilities;
3. Connections to **existing** buildings;
4. Construction of temporary spaces and facilities;
5. Ceiling work; connecting the Owner's equipment;
6. Installation of and connections to new utilities;
7. Demolition work;
8. Equipment Coordination.
9. Mechanical/Electrical Requirements of General Work.
10. Service Connections.
11. Interruption of Services and Service Shutdowns: Plan shutdowns so as to minimize shutdown time of any service. Request approval of a shutdown in writing to the Owner's Representative not less than fourteen (14) calendar days before the time that the shutdown is desired.
12. Field Measurements: Verify location of utilities and existing conditions. Notify Architect and Civil Engineer of conditions differing from those indicated on the Drawings.

1.6 CONSTRUCTION SCHEDULE (013213)

A. Construction Schedule: Within 21 days after award of Contract, prepare proposed initial detailed Construction Progress Schedule for review with Owner and Architect.
1. Keep Owner advised of intended operations and schedule and be guided by other constraints or timing of work that may develop during construction, as instructed by Owner.

B. Work sequences by various phases or areas will form the basis for the logic of Contractor's construction schedule. Sequencing has been developed with Owner to permit new construction and remodeling to be accomplished while maintaining services and functions with a minimum of disturbance.
1. It shall be recognized that unanticipated difficulties may arise, unanticipated conflicts in timing may occur or that Contractor will be able to develop alternatives which will benefit Project, timing of Work or Owner.
2. In such event, propose or develop with Owner, alternatives for acceptance by Owner in advance, which will improve Project and its progress.

1.7 SUBMITTAL PROCEDURES (013300)

A. Submittal Procedures: Prepare and submit a "Submittal Schedule" within 10 days after award of Contract, and prior to execution of Contract. Include the following information.
1. Specification Section Number.
2. Type of submittal required.
3. Estimated time for submittal.

B. Refer to Section 013310 for Submittal Transmittal.

C. Coordinate, organize and plan submittal schedule so submittals are sent with appropriate time allowed for review and so submittals do not accumulate into unreasonably large groups.

D. Electronic submittals is the preferred method of review. Follow these procedures:
1. Provide one PDF file for each submittal to Submittals Coordinator. PDF file must be unlocked, editable and printable to accommodate electronic mark-ups or printing a hard copy from mark-up.
2. Electronic submittals are to be complete and self-contained with each item requiring Archite action.

a. Web links or other electronic submittals requiring Architect to surf websites or navigate to find documents on websites or posting services are not acceptable.
b. If construction phase file hosting services or programs are used such as Prolog, Primavera or documents hosting programs may be considered subject to coordination with Architect.
c. Such procedures should not require Architect to search for submittals but should follow procedures that are the electronic equivalent of hard copy submittals sent by Contractor to Architect in a manner acceptable to Architect.

3. Where project data is intended to show colors, provide original hard copy only. See Product Data herein. No electronic submittals for color submittals.
4. Submit samples according to Samples article herein. No electronic submittals for samples will be permitted.
5. Architect will return one marked up electronic submittal for Contractor to process and distribute to subcontractors and for Owner according to Distribution article requirements herein.
6. On each electronic submittal, provide Contractor review and approval stamp on each submittals.

E. Number of Copies of Product Data

1. Submit four (4) minimum unless otherwise specified. One copy will be retained by Architect.
2. Additional copies for other contractors for purposes of information and coordination.
3. Number in submittal sequence.
4. Include contractor's stamp of approval, as evidence that drawings are approved in accordance with General Conditions (including field dimensions).
5. Indicate field verified information as applicable.
6. Provide a clear space of not less than 40 square inches for Architect's stamps.

1.8 QUALITY ASSURANCE (014300)

A. Comply with applicable codes, regulations, ordinances and requirements of authorities having jurisdiction, including accessibility guidelines where applicable. Submit copies of inspection reports, notices and similar documents to Architect.

B. Should the specifications, Architect's instruction, laws, ordinances or any public authority require any work to be inspected or approved, give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work requiring inspection should be covered up without approval or consent of the approving agency, it must be uncovered for examination at Contractor's expense.

C. Provide products of acceptable manufacturers that have been in satisfactory use in similar service for three years.

D. Use experienced installers. Furnish evidence of experience if requested.

E. Deliver, handle, and store materials in strict accordance with manufacturer's instructions.

F. Use of any supplier or subcontractor is subject to Owner's approval.

G. Engage and pay for testing agencies as required. Refer to individual sections for additional requirements.

1. Unless otherwise provided in the specifications, provide all materials, samples, mock-ups or assemblies for all tests specified in various sections of specifications, or as directed by the Architect, and pay shipping costs of such samples to laboratory or other testing location and facility.
2. Unless specified otherwise, all tests shall be made by an approved independent testing laboratory and reports provided to Architect.

H. Mock-Ups: Construct mock-ups for Architect's visual examination, for quality control, and performance of required testing. Use materials, fabrication and installation methods identical with those indicated for Work. Simulate surrounding conditions as closely as possible.

1.9 QUALITY CONTROL (014500)

A. Testing and Special Testing:

1. Unless otherwise provided in the specifications, provide all materials, samples, mock-assemblies for all tests specified in various sections of specifications, or as directed by Architect, and pay shipping costs of such samples to laboratory or other testing location a facility.
2. Unless specified otherwise, all tests shall be made by an approved independent testing laboratory and reports provided to Architect.
3. Tests shall be provided and accomplished in accordance with the standard used as the reference for the particular material or product, unless other test methods or criteria are specified.
4. In the absence of a referenced standard, tests shall be accomplished in accordance with applicable ASTM Standards or Test Methods, current at the date of the Contract Documents.
5. Requirements for Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

B. Tests shall be made by an approved independent testing laboratory and reports provided to Architect.
1. Qualifications of Testing Agency: "Approved independent testing laboratory" shall mean an independent testing agency acceptable to the Owner and the Architect and possessing the professional qualifications and equipment to perform the specified tests and to evaluate and report the results.
2. Comply with requirements of ASTM E329 and ASTM D3740.
3. Laboratory shall maintain a full-time registered Engineer on staff to review services.
4. Laboratory authorized to operate in State in which Project is located.
5. Testing equipment shall be calibrated at reasonable intervals with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constants.

C. Payment for Tests: Contract with and pay one or more independent testing agencies to perform testing, inspection of construction materials, conditions, and procedures for conformance with the Contract Documents and related actions, including reports.
1. Unless otherwise indicated, the cost of tests shall be paid by the Contractor.
2. Owner will not pay for tests to determine if a proposed material will initially meet the specified requirements, which will include but not be limited to, analysis of paving aggregate, paving mix designs, and similar tests.

D. Retesting Responsibility: Where results of required inspections, tests or similar prove unsatisfactory and do not indicate compliance of related work with requirements of the contract documents, then retests are responsibility of Contractor, regardless of whether original test was Contractor's responsibility.
1. Where required tests were performed on original Work, retesting of revised or replaced Work by Contractor is Contractor's responsibility,

E. Inspections: Should the specifications, Architect's instruction, laws, ordinances or any public authority require any work to be inspected or approved, give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work requiring inspection should be covered up without approval or consent of the approving agency, it must be uncovered for examination at Contractor's expense.

F. Certificates: Except for test reports provided and signed by approved independent testing laboratories, all certificates required by the specification shall be signed by an authorized official of the firm providing the certificate, with the signature notarized, when such certificates by the producer are acceptable to the Architect.

1.10 TEMPORARY UTILITIES (015100)

A. Temporary Electric Power Service. Provide grounded electric power service of sufficient size, capacity, and power characteristics during construction period.
1. Contractor, and each subcontractor shall provide their own temporary wiring, cords, outlets, lamps, and connections. Installation, service, wiring, and devices shall be safe, substantially supported and adequately connected.
2. Demand shall not exceed service and any damage resulting from misuse, faulty equipment overloading shall be paid for by persons responsible.

3. Wiring to job offices shall be responsibility of the Contractor and each subcontractor, including for fixture and bulbs.

B. Temporary Lighting. Lamps shall be provided by the Contractor, installed by electrical subcontractor. Provide one 100-W incandescent lamp per 500 square feet uniformly distributed, for general lighting, or equivalent illumination.

C. Electrical Outlets. Provide properly configured, NEMA-polarized outlets to prevent insertion of 110-to-120-V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset buttons, and pilot light for connection of power tools and equipment.

D. Electrical Power Cords. Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

E. Lamps and Light Fixtures. Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

1.11 CONSTRUCTION FACILITIES (015200)

A. Site Storage: Cooperate and coordinate use of available areas effectively and within sequence of Work. Owner will establish and govern use of the available space, with consideration to the needs of the subcontractors to work effectively on the site.

B. Sanitary Facilities: Coordinate use of toilet rooms with Owner. Owner will designate toilet rooms for worker use during Work of this Contract.

C. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class ABC, dry chemical extinguishers or a combination of extinguishers of NFPA recommended classes for possible exposures encountered.

D. Parking: The Owner will designate parking area for contractor on site. Parking for construction personnel shall be coordinated with Owner.

E. Waste Disposal: The Owner will identify location of dumpster on site. Coordinate with Owner waste evacuation route through facility and disposal.

1.12 TEMPORARY BARRIERS AND ENCLOSURES (015600)

A. Exterior Openings:
1. Temporary closures at exterior openings shall provide protection from weather and from the transfer of dust.
2. When any closure will be exposed to weather (or cold temperatures) from November to April it shall be insulated with 3 inch minimum blanket insulation, and have minimum of 1/2 inch plywood exterior face, and gypsum board inner face at temporarily occupied spaces.
3. Perimeters and penetrations shall be sealed with masking tape, caulk or other appropriate seal to eliminate passage of water, air and dust.
4. Closures shall be well maintained to protect against weather, dust and to provide security.

B. It is the Contractors responsibility to determine when a dustproof enclosure is required to protect any adjoining area. The Contractor is responsible, however, for providing a dustproof enclosure whenever requested by the Owner for this project.

C. Infection Control Requirements: Comply with the Owner's Infection Control Risk Assessment Program based upon the following:
1. Type D construction activity, and
2. Patient risk group.

D. Refer to Section 015615 - Airborne Contaminants Control.

1.13 PRODUCT OPTIONS AND SUBSTITUTION REQUIREMENTS (016210)

A. Bid and construct according to Contract Documents unless approval of substitution is provided in writing.

B. Basis of Design Products: Reference to "Basis of Design" and a named specific product or manufacturer is intended to establish criteria for use of that product and manufacturer based on that products published information whether or not those criteria are explicitly stated in Specifications.

1. "Equal" also means equal in project cost and therefore any costs resulting from substitutions, whether foreseen or not, whether project costs, owner administrative costs, or construction costs, may be deducted from the contractors contract sum when and as they arise. Design costs for changes resulting from substitutions will be billed by HGA directly to general contractor when incurred, and paid by the general contractor direct to HGA. This applies to pre-bid substitutions (which may also be retracted) and subsequent substitutions.

C. Architect and Owner reserve the right to accept or reject proposed products. Should a proposed product be unable to meet requirements to satisfaction of Architect, product shall not be used.

D. Submit requests for substitution in writing to Architect at least ten days prior to bid date and hour. Requests received after this time will not be considered.

1. Refer to Section 016211 for Substitution Request Form.
2. Submit Substitution Request Form completed in full.
3. Submit manufacturer's printed information supporting claim that proposed product meets specified requirements. Provide following as applicable:
   a. Literature
   b. Specifications
   c. Drawings
   d. Cut Sheets
   e. Performance data
   f. List of reference projects of similar size, value and complexity
   g. Model numbers
   h. Other information necessary to completely describe item.
4. Provide a point by point comparison between key features of specified Basis of Design item and proposed substitution.
5. Provide submitted materials marked with Article and Paragraph references from Specification using highlighter, marker and flags on pages to facilitate review and show that substitution meets specified requirements.
6. Provide a letter indicating requestor has reviewed Contract Documents and examined site (if needed) and that proposed substitution meets specified requirements.

E. Limitations on substitutions after bids or during construction: Changes will not be allowed to accepted list of products, except when specified or accepted product subsequently is determined as not meeting requirements of Contract Documents or product becomes unavailable, and then only under following conditions:

1. Orders were placed in timely manner as required after list of materials is accepted. No excuse or proposed substitution will be considered for products due to unavailability unless proof is submitted that firm orders were placed in a timely manner.
2. Reason for unavailability is beyond control of Contractor: prolonged strikes or lockouts which will delay Project to an extent unacceptable to Owner, bankruptcy, discontinuance of a product, delays or Acts of God or other similar reasons.
3. Request for substitution is submitted in writing within 10 days after date Contractor becomes aware product does not comply with specifications or has become unavailable, accompanied by supporting evidence.
4. No extra cost to Owner.
5. Substitution does not compromise design intent or quality required.
6. Substitute product is acceptable to Owner and Architect.
7. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Arc

redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

8. Requested substitution does not require revisions to Contract Documents.
9. Requested substitution is consistent with the Contract Documents and will produce intended and indicated results.
10. Substitution request is fully documented and properly submitted.
11. Requested substitution will not adversely affect Contractor's Construction Schedule.
12. Requested substitution has received necessary approvals of authorities having jurisdiction.
13. Requested substitution is compatible with other portions of Work.
14. Requested substitution has been coordinated with other portions of Work.
15. Requested substitution provides specified warranty.
16. If requested substitution involves more than one trade, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to installers involved.

1.14 OWNER-FURNISHED PRODUCTS (016400)

A. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

B. Equipment will be delivered to Owner's storage by party having title or custody.

1. In addition to items themselves, installation and assembly instructions, shop drawings, templates, accessories will be delivered to Contractor in order that Contractor may proceed with work of installing.

C. Delivery of equipment, installation instructions, shop drawings, templates, and accessories will be in accordance with schedules as established by Owner.

D. For installation of new equipment furnished by Owner and installed by Contractor, Owner will deliver equipment to Project, uncrate or unpack, assemble, clean and otherwise make equipment ready for installation and connection.

E. Contractor Installation: Work consists of transporting equipment to installation locations, setting in place, building in, leveling and attachment to building construction.

1.15 EXECUTION (017300)

A. Quality Assurance:

1. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
2. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

B. Examination:

1. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, contractor shall investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
   a. Before construction, contractor shall verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities. All costs associated with underground location services shall be the responsibility of the contractor.

b. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

2. Existing building structure is a post-tensioned flat slab and beam design. Testing agency must verify and clearly mark slab tendon locations (by GPR or X-ray) prior to any drilling and anchorage into the flat slab. Anchorage into the post-tensioned beams is not allowed. Minimum anchorage clearance to slab tendons shall be 6-inches. General contractor shall coordinate this procedure with the project sub-contractors and the testing agency.
3. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   a. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   b. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   c. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

C. Preparation:

1. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
2. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
3. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
4. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect.

D. Installation:

1. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   a. Make vertical work plumb and make horizontal work level.
   b. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   c. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
2. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
3. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
4. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
5. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
6. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
7. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
8. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, ve size and type required for load conditions.

a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
b. Allow for building movement, including thermal expansion and contraction.
c. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

9. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
10. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

E. Progress Cleaning:

1. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   a. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   b. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
   c. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      1) Use containers intended for holding waste materials of type to be stored.
   d. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
2. Site: Maintain Project site free of waste materials and debris.
3. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   a. Remove liquid spills promptly.
   b. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
4. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
5. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
6. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
7. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
8. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
9. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

F. Starting and Adjusting:

1. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
2. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
3. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
4. Manufacturer's Field Service: Comply with qualification requirements in Section 014300 Quality Assurance.

G. Protection of Installed Construction:

1. Provide final protection and maintain conditions that ensure installed Work is without d... or deterioration at time of Substantial Completion.
2. Comply with manufacturer's written instructions for temperature and relative humidity.

1.16 CUTTING AND PATCHING (017329)

A. Perform cutting, demolition, removal work, patching and restoration of work as necessary to accomplish and complete all work under the Contract, including any relocation or reuse of existing materials, equipment, systems, or other work, as well as the disposition of salvaged materials or debris.
   1. Temporary Protection: Provide protective coverings and enclosures necessary to prevent damage to existing spaces and materials to remain.
   2. Remove unsalvable materials in a manner that will avoid damage to materials or equipment which will remain. Completely remove and legally dispose away from the site.
   3. Salvable materials and items designated for reuse, relocation, or to be stored by Owner; such as brick, millwork, or equipment; shall be removed by the applicable trades and relocated to the new location or stored and protected from damage until incorporated into the new work.

B. Patching and Remodeling: Patch or otherwise restore disturbed existing construction as indicated on the drawings and schedules, or as otherwise required to restore the work and surfaces. Patching or restoration shall be carried to natural breaks (i.e., corners) wherever possible. Where existing construction is removed, cut or otherwise disturbed by Work of the Project, patch defective and incomplete surfaces. Repair any damage to existing construction which is to remain.

C. Floor Preparation at Existing Concrete Slabs:
   1. Prepare existing concrete slabs for the installation of various floor finish materials.
   2. Roughen surfaces which are glossy or which have loose surface material or curing sealers by sanding, scarifying or acid etching as required. Remove surface material that is not compatible with adhesive. Clean thoroughly to remove all oil, dirt, sealer materials and dust.

D. Concrete Surface Preparation for Sealers:
   1. Clean concrete by shot blasting to remove dirt, oils, films, and other materials detrimental to sealer application.
   2. Acid etch surface of concrete to produce a surface profile matching CSP 1 per ICRI 03732. Prepare surface for acid etching by detergent scrubbing to remove oils and films that may prevent acid penetration.
      a. Remove excess acid solution, reaction products, and debris by squeegee or vacuuming.
      b. Scrub surface with an alkaline detergent, rinse, and squeegee or vacuum.
      c. Check acidity of surface with pH test paper and continue rinsing until pH is acceptable.
      d. When pH is acceptable and surface is clean, vacuum dry.

E. Cleaning: Perform periodic and final cleaning.
   1. Clean Owner-occupied areas daily.
   2. Clean spillage, overspray, and heavy collection of dust in Owner- occupied areas immediately.
   3. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.
   4. At completion of alteration work in each area, provide final cleaning and return space to a condition suitable for use by Owner.

1.17 CLOSEOUT PROCEDURES (017700)

A. Plan an efficient, orderly and coordinated completion process including organizing, scheduling and coordinating the following.
   1. Work of contractor's own forces.
   2. Work of subcontractors.
   3. Establish firm commitments for on-time completion.
   4. Owner's needs for accommodations and time to occupy project during closeout per schedule of substantial completion and final completion.

B. Closeout:
   1. Prepare punchlist for remaining work for review by the Architect.
   2. Complete punchlist items promptly at no additional expense to the Owner.

3. Test equipment and systems to demonstrate each system and piece of equipment is installed and operating properly.
4. Submit accurate record documents of building and site.
5. Submit operating manuals, maintenance manuals, and warranty information.
6. Obtain and submit copy of occupancy permits.
7. Train Owner in use of building systems.
8. Remove temporary facilities.
9. Provide final cleaning and touch-up.
10. Restore portions of building, site improvements, and other items damaged by construction operations to the satisfaction of the Architect at no additional expense to the Owner.

C. After Substantial Completion expedite completion of remaining work in an organized, efficient manner that maintains quality standards. Perform such work according to following requirements.
1. Scheduled work in advance with Owner.
2. Perform Work in occupied spaces when space is not in use, such as after hours in administrative areas, unless otherwise approved by Owner.
3. When necessary, use overtime to accomplish work not able to be completed during normal work hours at no extra cost to Owner.
4. Perform Work in occupied areas in a manner and at such time as will not significantly interfere with, hamper or inconvenience Owner's program or functions.

D. Final payment will not be made until final acceptance inspection, completion of punch list items and final sign-off by Owner and Architect.

1.18 CLOSEOUT SUBMITTALS (017800)

A. Provide operating instruction data and maintenance manuals. At time of instructions to Owner, submit two copies of the manuals to the Owner. The instructions shall include maintenance information and the following.
1. Cleaning instructions.
2. Manufacturer's information, including list of spare parts.
3. Maintenance materials to be used.
4. Parts list with numbers and recommended parts for Owner's stock.
5. Nearest depot for parts; wiring and piping diagrams.
6. Lubrication data and schedules.
7. Other maintenance, adjustment and repair data and a listing of names, addresses, and telephone numbers of appropriate service organizations for various items and equipment.
8. Name, address, and telephone number of installer or supplier.
9. Maintenance procedures.
10. Maintenance and service schedule for preventive and routine maintenance.
11. Maintenance record forms.
12. Copies of maintenance service agreements.
13. Copies of warranties and bonds.

B. Record Set of Drawings. Contractor shall provide record set of drawings to the Architect at the completion of Contract. Marking record set shall be done methodically as work progresses, clearly and neatly, in color, and shall record the following:

1. Changes, deviations or revisions made, except minor or noncritical dimensions, including those made by Change Order or Supplementary Instructions.
2. Omissions, including work omitted by accepted alternates.
3. Dimensioned locations of major or main utilities, such as main conduit runs, piping mains and similar work.
4. Locations of control valves.
5. Additions to the work.
6. Changes in significant details.
7. Locations of electrical home run boxes, including circuit numbers and panel designations for each box.
8. Changes in locations of panelboards, outlets, drains, piping, openings, dampers and similar features.
9. Other similar data.

END OF SECTION

SECTION 013310
SUBMITTAL TRANSMITTAL

To: Hammel Green and Abrahamson, Inc.
Attn: Submittals Coordinator
420 5th St North, Suite 100
Minneapolis, Minnesota 55401
Email: Submittals@ HGA.com
Owner:
Project:
HGA No.:

From: (Contractor)
(Address)
(Address)
(City, State)

Submittal Date:_____
Previous Submittal Date:_____

Incomplete submittals will be returned "Not Accepted." See General Conditions and 013300 for requirements.

The following submittal(s) is (are) attached for your review as required by the Contract Documents.

SHOP DRAWINGS

___ No. copies submitted. Submit minimum 1 copies per 013300; complete the following information:

☐Partial ☐Complete ☐Preliminary ☐Final ☐LEED

List of Drawings:_____

Specification Section:_____ Article & Paragraph:_____

Description of Item:_____

Manufacturer:_____

Supplier's Name:_____ Telephone Number:_____

PRODUCT DATA AND QUALITY CONTROL

___ No. copies submitted. Submit minimum 1 copies per 013300; complete the following information:

☐Partial ☐Complete ☐Preliminary ☐Final ☐LEED

List of Items:_____

Specification Section:_____ Article & Paragraph:_____

Description of Item:_____

Manufacturer:_____

Supplier's Name:_____ Telephone Number:_____

SAMPLES

___ No. copies submitted. Submit minimum 3 copies per 013300; complete the following information:

☐Partial ☐Complete ☐Preliminary ☐Final ☐LEED

List of Items:_____

Specification Section:_____ Article & Paragraph:_____

Description of Item:_____

Manufacturer:_____

Supplier's Name:_____ Telephone Number:_____

Submitted By: **Company Name:** _____
Phone: _____

Signature: _____

Send to: Submittals@hga.com

SECTION 016211
SUBSTITUTION REQUEST FORM

To: **Hammel, Green and Abrahamson, Inc.**
170 Maiden Lane, Fifth Floor
San Francisco, CA 94108
Attention: Randy Markham, Patricia Hansen; rmarkham@hga.com; phansen@hga.com;

Project: County of San Mateo Serenity House Respite Center

HGA Comm. No.: 3505-003-01 **Date Received:**_____

Specification Section Number and paragraph:_____

Drawing and details affected:_____

Proposed Substitution:_____

Manufacturer:_____

Product (model, pattern, etc.):_____

WHY IS SUBSTITUTION BEING SUBMITTED? (Select one of the following):

- ☐ Pre-Bid Substitution (Prior Approval) Bid Date:
- ☐ Specified product is not available. Explain.
- ☐ Cost savings to Owner. Indicate comparative cost analysis.
- ☐ Other: Explain.

EFFECTS OF PROPOSED SUBSTITUTION: Answer the following questions and attach explanations.

Does substitution affect dimensions indicated on Drawings?
☐NO ☐YES, explain:

Does substitution affect Work of other Sections?
☐NO ☐YES, explain:

Does substitution require modifications to design, changes to Drawings, or revisions to specifications to be incorporated into the Project?
☐NO ☐YES, explain:

Attach list of at least 3 projects where proposed substitution has been used within past 12 months; include name, address, and telephone number of Owner and Architect.

CONTRACTOR'S / BIDDER'S REPRESENTATION

Undersigned accepts responsibility for coordination of proposed substitution and accepts all additional costs resulting from the incorporation of proposed substitution into the Project per Section 016210 and 010000. Design costs for changes resulting from substitutions will be paid by the the general contractor.

SUBMITTED BY:

_____

_____

Fax No: _____

For Architect's use:
☐ Accepted ☐ Not Accepted
☐ No Action Required
☐ Submission: Incomplete
☐ Too Late
Reviewed by/date:_____
Comments:_____

Subcontractor's signature and date:_____

Contractor's signature and date:_____

SECTION 024000
DEMOLITION

1.1 GENERAL

2.0 SUMMARY

A. Removing above-grade site improvements within limits indicated.

B. Disconnecting, capping or sealing, and abandoning site utilities in place.

C. Disconnecting, capping or sealing, and removing site utilities.

D. Disposing of objectionable material.

2.1 RELATED SECTIONS

E. Section 311100 – Clearing and Grubbing.

F. Section 311300 – Selective Tree Removal and Trimming.

G. Section 311400 – Earth Stripping and Stockpiling.

H. Section 312300 – Excavation and Fill.

2.2 DEFINITIONS

I. ANSI: American National Standards Institute.

J. CAL-OSHA: California Occupational Safety and Health Administration.

2.3 PROJECT CONDITIONS

K. Except for materials indicated to be stockpiled or to remain the Owner's property, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.

L. Salvageable Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the Owner. Avoid damaging materials designated for salvage.

M. Unidentified Materials: If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the Owner. If necessary, the Owner will arrange for any testing or analysis of the discovered materials and will provide instruction regarding the removal and disposal of the unidentified materials.

1.2 PRODUCTS

2.0 SOIL MATERIALS

N. Backfill excavations resulting from demolition operations with on-site or import materials conforming to structural/engineered backfill defined in Section 312300 Excavation and Fill.

1.3 EXECUTION

2.0 PREPARATION

O. Protect and maintain benchmarks and survey control points during construction.

P. Protect existing site improvements to remain during construction.

2.1 RESTORATION

Q. Restore damaged improvements to their original condition, as acceptable to the Owner.

2.2 UTILITIES

R. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned.

S. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.

T. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless authorized in writing by the Owner, and then only after arranging to provide temporary utility services according to requirements indicated.

U. Coordinate utility interruptions with utility company affected.

V. Do not proceed with utility interruptions without the permission of the Owner and utility company affected. Notify Owner and utility company affected two working days prior to utility interruptions.

W. Excavate and remove underground utilities that are indicated to be removed.

X. Securely close ends of abandoned piping with tight fitting plug or wall of concrete minimum 6-inches thick.

2.3 SITE IMPROVEMENTS

Y. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

Z. Remove slabs, paving, curbs, and gutters, as indicated. Where concrete slabs, curb, gutter and asphalt pavements are designated to be removed, remove bases and subbase to surface of underlying, undisturbed soil.

AA. Unless the existing full-depth joints coincide with line of pavement demolition, neatly saw-cut to full depth the length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

BB. Remove driveways, curbs, gutters and sidewalks by saw cutting to full depth. If saw cut falls within 30-inches of a construction joint, expansions joint, score mark or edge, remove material to joint, mark or edge.

2.4 BACKFILL

CC. Place and compact material in excavations and depressions remaining after site clearing in conformance with Section 312300 Excavation

2.5 DISPOSAL

DD. Remove surplus obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

END OF SECTION

SECTION 024119
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of building or structure.
      a. Base Bid Roofing System: Removal of existing roof gravel, existing BUR membrane system to remain.
      b. Alternate Bid Roofing System: Removal of existing BUR roof system, roof sheathing to remain.
   2. Demolition and removal of site elements.
   3. Salvage of existing items to be reused or recycled.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 075113 – Built-Up Asphalt Roofing: Base Bid and Alternate Bid installation.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
   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 stairs.
   5. Locations of proposed dust- and noise-control temporary partitions and means of egress.
   6. Means of protection for items to remain and items in path of waste removal from building.

B. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI A10.6 and NFPA 241.

E. Pre-Demolition Conference: Conduct conference at Project site to review methods and procedures related to selective demolition including, but not limited to, the following:
   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 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
   2. Arrange to shut off indicated utilities with utility companies.
   3. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   4. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
      a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   3. Cover and protect furniture, furnishings, and equipment that have not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   5. Maintain adequate ventilation when using cutting torches.
   6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   8. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.5 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, then remove concrete between saw cuts. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
   1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

D. Roofing Gravel: Carefully remove gravel and aggregates from existing BUR roof with BUR roofing membrane to remain.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 031500
CONCRETE ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concrete accessories and related materials for cast-in-place concrete.
   2. Coordinate Work of this Section with requirements of Section 033000.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 033000 - Cast-in-Place Concrete.
   3. Section 079000 - Joint Protection.

1.2 SUBMITTALS

A. Submit in accordance with Section 010000.

B. Product Data: Manufacturer's specifications, technical data including performance, construction and fabrication information.

C. Certificates: Provide a letter stating each product specified in this Section has been evaluated and found compatible with other sections.

PART 2 PRODUCTS

2.1 UNDERSLAB VAPOR BARRIERS

A. (UVB-3) Under-Slab Vapor Barrier: ASTM E 1745, Class A. Permeance of less than 0.01 perms before and after mandatory conditioning tests per ASTM E 1745, Sections 7.1.1 – 7.1.5.
   1. Minimum Thickness, ACI 302: 15-mil
   2. Maximum Water Vapor Permeance, ASTM E 154: 0.01 perms
   3. Minimum Tensile Strength, ASTM E 154: 45 lbf/in.
   4. Puncture Resistance, ASTM D 1709: 2200 grams
   5. Manufacturers and Products:
      a. Epro Services: Ecoshield E15
      b. Raven Industries: VaporBlock VBLP15.
      c. Reef Industries: Griffolyn 15 Mil Green.
      d. Stego Industries: Stego Wrap 15 mil.
      e. Viper: VaporCheck 16 mil.
      f. W.R. Meadows: Perminator 15 mil.

B. Vapor Barrier Accessories:
   1. Seam Tape: By same Manufacturer as vapor barrier, minimum width 4 inches.
      a. Water Vapor Transmission: Less than 0.3 perms per ASTM F 1249 or ASTM E 96.
   2. Pipe Boots:
      a. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.
   3. Perimeter/edge seal:
      a. Stego Crete Claw by Stego Industries LLC, or comparable product by approved Manufacturers.
      b. Stego Term Bar by Stego Industries LLC, or comparable product by approved Manufacturers.
      c. StegoTack Tape (double sided) by Stego Industries LLC, or comparable product by approved Manufacturers.

2.2 CURING AND SEALING MATERIALS

A. Manufacturers: Subject to compliance with the requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, those listed below.

B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. Spray-Film; ChemMasters.
   2. Sure Film; Dayton Superior Corporation.
   3. Eucobar; Euclid Chemical Co.
   4. E-Con; L&M Construction Chemicals, Inc.
   5. SpecFilm ; SpecChem, LLC

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. (CS-2) Clear, Non-yellowing, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A, minimum 30 percent total solids. Comply with ACI 301, only for floors to remain bare or where surface treatments are compatible. Apply in accordance with manufacturer's recommendations. For floors to remain bare such as mechanical or utility rooms thoroughly clean surface and apply additional roller application just prior to project completion.
   1. Polyseal WB; ChemMasters.
   2. Vocomp-30; W. R. Meadows, Inc.

2.3 POST-INSTALLED ANCHORS

A. Manufacturers: Where anchor manufacturer and proprietary anchor type is not specifically indicated on Drawings, subject to compliance with requirements and acceptance by Architect, manufacturers offering products that may be incorporated into the Work include, but are not limited to, those listed below.
   1. Other manufacturers will be acceptable only if approved by ICC with a valid ICC Research Report submitted for Engineer review.

B. Drilled-In Anchors:
   1. Expansion Wedge Anchors:
      a. Concrete Fastening Systems: Thunderstud.
      b. Hilti: Kwik-Bolt II.
      c. ITW Ramset/Redhead: Trubolt.
      d. Powers Fasteners: Power-Stud.
      e. Simpson Strong-Tie: Wedge-All.
   2. Cartridge Injection Adhesive Anchors:
      a. Hilti: HAS, HIT, or HIT TZ Adhesive Anchor.
      b. ITW Ramset/Redhead: A7, C6, or G5 Adhesive Anchors
      c. Powers Fasteners: Power-Fast.
      d. Simpson Strong-Tie: Epoxy-Tie Adhesive.

C. Concrete and masonry screws
   1. Concrete Fastening Systems: Tapcon.
   2. Hilti: Kwik-Con II+ Fastening System.
   3. ITW Ramset/Redhead: Tapcon.
   4. Powers Fasteners: Tapper.
   5. Simpson Strong-Tie: Titen High-Low Threaded Self-Tapping Concrete and Masonry Screw.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install concrete accessories and related materials as specified in Section 033000 - Cast-in-Place Concrete.

END OF SECTION

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete, cement, aggregates, water and admixtures.
   2. Proportioning, mixing, conveying, placing, finishing, curing, and testing of cast-in-place concrete.
   3. Installation of concrete accessories for cast-in-place concrete.
   4. Coordinate installation of embedded items furnished and installed under other sections.
   5. Precast concrete items.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 079000 – Joint Protection.
   3. Section 312300 – Excavation and Fill.

1.2 REFERENCES

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials

B. ACI 214 - Recommended Practice for Evaluation of Strength Test Results of Concrete.

C. ACI 301 - Specifications for Structural Concrete for Buildings.

D. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.

E. ACI 305 - Hot Weather Concreting.

F. ACI 306 - Cold Weather Concreting.

G. ACI 309 - Guide for Consolidation of Concrete.

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

1.3 DEFINITIONS

A. Floor Flatness Number, F_F, measures floor curvature or flatness per ASTM E 1155.

B. Floor Levelness Number, F_L, measures floor inclination from a horizontal plane per ASTM E 1155.

C. Floor Levelness, (F_L), tolerances only apply to nonsloping slabs-on-grade and suspended slabs shored at time of testing. Floor Levelness tolerances shall not apply to slabs placed on unshored form surfaces, shored surfaces after removal of shores, or pitched slab surfaces per ACI 302.

D. Overall F_F/F_L numbers represent minimum values acceptable for all combined local floor test sections representing the specified floor finish area per ACI 302.

E. Local F_F/F_L test areas shall be defined as follows per ACI 302.
   1. Areas bounded by construction or control joints for slabs-on-grade.
   2. Areas bounded by columns and/or wall lines for elevated structural slabs.
   3. No less than one-half bay size.

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

G. Linear Drying Shrinkage at 28 days: Perform shrinkage tests of hardened concrete specimens in accordance with ASTM C157 and as noted below:
   1. Test specimens shall be moist cured for 7 days, then store specimen in air for a period of 28 days.
   2. Report length change of specimens at 4, 7, 14, 21 and 28 days after moist cure is complete.

3. Length change, reported as a percentage change of original length, at 28 days is the linear drying shrinkage at 28 days.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Submit mix design for each type and strength of concrete. Proportion designs in accordance with "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318.

C. Each mix design shall contain the following information:
   1. Mix number (which will correspond to mix ticket on trucks delivered to site) and location of concrete on project.
   2. Applicable mix specifications including:
      a. Design strength.
      b. Slump.
      c. Air content.
      d. Unit weight.
   3. Mix ingredients including quantities, ASTM designations, and sources for:
      a. Cementitious materials including fly ash, silica fume, and GGBFS.
      b. Aggregates.
      c. Water.
         1) Indicate amounts of mix water to be withheld for later addition at Project Site.
      d. Admixtures (including manufacturer).
   4. Test results:
      a. Compressive strength results of trial batches or historical test data.
      b. Statistical computations showing required average strength of mix.
      c. Aggregate property results for exterior horizontal concrete in accordance with Article 2.1.C of this Section.
      d. Combined aggregate gradation as indicated for slab-on-grade mixes.
      e. Unit weight.
      f. Slump.
      g. Water/cementitious ratio of mix.
      h. Air content.
   5. Material Certificates: Signed by manufacturers certifying that materials comply with Project requirements.

D. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   1. Proposed construction joint and saw cut contraction joints locations for slab on grade.
   2. Location of joints is subject to approval of the Architect/Engineer.

F. Slab Depression Layout: Indicate locations and depths of depressed slab for terrazzo, walk-off mats, and other architectural floor finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Placing, Finishing, and Curing Procedures: Detailed description of methods, materials, and equipment used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Use plant mixed concrete mixed in stationary mixers.
   1. Truck mixed concrete is allowed provided procedures in ASTM C94 are followed and documented.
   2. Mix and deliver concrete in accordance with ASTM C94.

B. Installer Qualifications: Perform concrete work in accordance with ACI 318, unless specified otherwise. Installation work shall be supervised by a ACI-certified Flatwork [Technician] [Finisher].

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type I or Type I/II, corresponding to cement on which selection of concrete proportions was based. Use same brand for each required type of concrete.

B. Normal Weight Concrete Aggregates: (Excluding exterior horizontal concrete) ASTM C33, uniformly graded. Do not use aggregates containing soluble salts or other substances which can cause stains on exposed surfaces. Use aggregates from one source of supply corresponding to that on which selection of concrete proportions was based.

C. Aggregate Gradation: Conform to ASTM C 33 and as specified herein.

1. Well Graded Aggregate: Provide in concrete mixes indicated with the combined coarse and fine aggregates meeting the following criteria:

	Top Size Aggregate		
	1 ½"	1"	¾"
Sieve Size	**% Retained on Sieve**		
1 ½"	0% - 8%		
1"	8% - 18%	0% - 8%	
¾"	8% - 18%	8% - 22%	0% - 6%
½"	8% - 18%	8% - 22%	6% - 22%
3/8"	8% - 18%	8% - 22%	6% - 22%
No. 4	8% - 18%	8% - 22%	6% - 22%
No. 8	8% - 18%	8% - 22%	6% - 22%
No. 16	8% - 18%	8% - 22%	6% - 22%
No. 30	8% - 18%	8% - 22%	6% - 22%
No. 50	3% - 12%	3% - 12%	3% - 12%
No. 100	0% - 8%	0% - 8%	0% - 8%
No. 200	0% - 5%	0% - 5%	0% - 5%

a. At least 55% by weight shall be retained on or above the #4 sieve.
b. A maximum of two non-adjacent sieves between 1 inch and No. 50 may fall outside the prescribed limits above with a minimum of 5% retained and a maximum of 22% retained on these nonconforming sieves.

D. Water: ASTM C94. Fresh, clean, potable, free from injurious amounts of oils, acids, alkalies, salts, organic materials, or other substances that may be deleterious to concrete or steel.

2.2 ADMIXTURES

A. General: Admixtures shall be certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride or thiocyanates.

B. Manufacturers: Subject to compliance with the requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, those listed below.

C. Air-Entraining Admixtures (AEA): ASTM C260.

1. Euclid Chemical Company: Air-Mix.
2. General Resource Technology: Polychem AE.
3. Grace Construction Products: Daravair series or Darex series.
4. BASF: MasterAir AE 90

5. Protex Industries: Protex AES.

D. Water Reducing Admixtures (WRA): ASTM C494, Type A.
   1. Euclid Chemical Company: Eucon WR-75.
   2. General Resource Technology: Polychem 1000.
   3. Grace Construction Products: WRDA.
   4. BASF: MasterPozzolith 210 or MasterPozzolith 322 N

E. Mid-Range Water-Reducing Admixtures (MRWRA): ASTM C494, Type A.
   1. Euclid Chemical Company: Eucon A+.
   2. General Resource Technology: KB-1000.
   3. Grace Construction Products: Daracem-65.
   4. BASF: MasterPolyheed 997 or MasterPolyheed FC100.

F. High-Range Water Reducing Admixture (HRWRA): ASTM C494, Type F or G.
   1. Euclid Chemical Company: Eucon 37 or Plastol 5000.
   2. General Resource Technology: Melchem.
   3. Grace Construction Products: ADVA 100 or Daracem 100.
   4. BASF: MasterGlenium 3030 NS, 3030 NS, or 3200 HES.

G. Water Reducing and Retarding Admixture: ASTM C494, Type D.
   1. Euclid Chemical Company: Eucon Retarder-75.
   2. General Resource Technology: Polychem R.
   3. Grace Construction Products: Daratard 17.
   4. BASF: MasterPozzolith 80 or MasterPozzolith 200N.

H. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E,
   1. Euclid Chemical Company: Accelguard 80.
   2. General Resource Technology: Polychem Super Set.
   3. Grace Construction Products: Polarset.
   4. BASF: MasterSet AC 534.

I. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
   1. Axim Italcementi Group, Inc.: CATEXOL CN-CI.
   2. BASF Construction Chemicals - Building Systems: MasterLife CI 30.
   3. Euclid Chemical Company (The), an RPM company: ARRMATECT, EUCON BCN, or EUCON CIA.
   4. Grace Construction Products, W. R. Grace & Co.: DCI.
   5. Sika Corporation: Sika CNI.

J. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
   1. BASF Construction Chemicals - Building Systems: MasterLife CI 222+.
   2. Cortec Corporation: MCI 200 or MCI 2005
   3. Grace Construction Products, W. R. Grace & Co.: DCI-S.
   4. Sika Corporation: FerroGard 901.

K. Viscosity Modifying Admixture: ASTM C494, Type S
   1. Euclid Chemical Company: Visctrol.
   2. General Resource Technology: Polychem VMA.
   3. Grace Construction Products: V-MAR 3.
   4. BASF: MasterMatrix VMA 362.

L. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, [**free of carbon black,**] nonfading, and resistant to lime and other alkalis.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. ChemMasters.

b. Davis Colors.
c. Dayton Superior Corporation.
d. Hoover Color Corporation.
e. Lambert Corporation.
f. QC Construction Products.
g. Rockwood Pigments NA, Inc.
h. Scofield, L. M. Company.
i. Solomon Colors, Inc.

2. Color: [As indicated by manufacturer's designation] [Match Architect's sample] [As selected by Architect from manufacturer's full range].

M. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures effectively containing chloride ions (more than 0.05 percent) are not permitted.

2.3 BONDING COMPOUNDS

A. Bonding Compound: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene. Use to bond toppings to base slab.

2.4 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

C. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete and that contains a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing.
1. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.5 CONCRETE MIXING

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 211.1 and ACI 301.

B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, with exceptions specified herein, and ASTM C 1116 where fibers are used, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

C. Admixtures: Use approved admixtures according to manufacturer's written instructions.
   1. Use chemical admixtures in concrete, as required, for placement, workability, durability, and controlled set time.

D. Air Content:
   1. Exterior exposed concrete shall contain 6 percent entrained air with maximum tolerance of plus or minus 1.5 percent
   2. Do not allow air content of hard-troweled finished floors to exceed 3 percent.

E. Concrete Slump Limits: Measured according to ASTM C 143 at point of placement.
   1. 4 inches without water reducing admixtures
   2. 5 inches after addition of WRA or MRWRA.
   3. 7 inches after addition of HRWRA.
   4. A tolerance of up to one inch above indicated maximum will be allowed for one batch in any five consecutive batches tested.
   5. If the maximum water-cement ratio is not exceeded, concrete arriving at the jobsite within 60 minutes of the initial batching that has a slump less than the maximum allowed may have water added when accepted by the project inspector.
   6. Water reducing admixtures may be added to increase the slump when water cannot be added and additional slump is necessary for workability when accepted by the project inspector.
   7. Truck batch tickets shall clearly indicate maximum water permissible for adding at jobsite without exceeding the specified maximum water-cementitious materials ratio.
   8. Water shall not be added to the mix after any supplemental water reducing admixtures have been dosed into the mixer.
   9. Water shall not be added to mix after samples are taken from batches randomly selected for testing.

2.6 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

Item	Requirements
Compressive Strength at 28 days (min), f'_c	3000 psi
Maximum water/cementitious materials ratio, w/cm	0.55
Cementitious Materials Portland Cement, Type I or Type I/II Supplementary Cementitious Materials	 [**80%**] maximum [**20%**] minimum
Top Size Aggregate Required	1-1/2 inch

B. Foundation Piers and Building Walls: Proportion normal-weight concrete mixture as follows:

Item	Requirements
Compressive Strength at 28 days (min), f'_c	4000 psi
Maximum water/cementitious materials ratio, w/cm	0.45
Cementitious Materials Portland Cement, Type I or Type I/II Supplementary Cementitious Materials	 60% - 80% 20% - 40%
Top Size Aggregate Required	3/4 inch

C. Slabs on Grade: Proportion normal-weight concrete mixture as follows:

Item	Option A	Option B
Compressive Strength at 28 days (min), f'_c	4000 psi	4000 psi
Maximum water/cementitious materials ratio, w/cm	0.45	0.45

Cementitious Materials Content	540-580 lbs/yd^3	500-540 lbs/yd^3
Cementitious Materials Portland Cement, Type I or Type I/II Fly Ash, Class C or F	60% - 85% 15% - 40%	
Top-size Aggregate	1 inch	1-1/2 inch
Aggregate Gradations	Well Graded	
Air Entraining Admixture, (AEA)	None	
Coarseness Factor	52 - 70	
Workability Factor	32 - 40	
Water Reducing Admixture, (WRA), ASTM C 494, Type A	As necessary to bring slump up to maximum 5-inches within manufacturer's limits.	
High-Range Water Reducing Admixture, (HRWRA), ASTM C 494, Type F	As necessary to further increase slump for additional workability up to maximum 7-inches within manufacturer's limits.	

PART 3 EXECUTION

3.1 INSTALLATION OF UNDERFLOOR VAPOR BARRIERS

A. Install vapor barrier (UVB-3) directly below all new interior slabs.
   1. Place vapor barrier over underfloor material specified in Division 31.
   2. Do not cover vapor barrier with sand or aggregate.
   3. Pour concrete slab directly over vapor barrier.

B. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

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

D. Verify that sleeves, ties, and other penetrating components which pass through surfaces to receive barrier are rigidly installed.

E. Clean substrates of substances harmful to vapor barriers, including removing projections capable of puncturing vapor barriers.

F. Place, protect, and repair vapor barrier sheets in accordance with manufacturer's instructions and ASTM E1643.
   1. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.
   2. Lap vapor barrier over footings and seal to foundation walls.
   3. Overlap joints 6 inches and seal with pressure sensitive tape.
   4. Seal penetrations including pipes, conduits, and ducts with pipe boots and pressure sensitive tape.
   5. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
   6. Terminate vapor barrier at walls with sealant.
   7. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with pressure sensitive tape.

3.2 PLACING CONCRETE

A. Place concrete in accordance with ACI 301. Consolidate concrete in accordance with ACI 309 using high frequency vibrators.

B. Clean forms, reinforcing and accessories and dampen forms immediately prior to placing concrete.

C. Schedule concrete deliveries to ensure that concrete in each load is placed within 90 minutes after mixing water is added.

D. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

E. Deposit concrete as near as practicable to its final position to avoid segregation due to rehandling or flowing, in layers not exceeding 18 inch in depth. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
3. Do not insert vibrators to bottom of slabs-on-grade with underfloor vapor barriers to avoid damaging this membrane.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations

G. Do not allow concrete to fall freely more than 5 feet. Use tremies, chutes or elephant trunks where necessary.

H. Exercise care to prevent "overpouring" columns. Remove column concrete which projects more than 1/2 inch into supported slab or beam. Avoid damaging reinforcing steel during removal.

I. Do not use concrete that has partially hardened or been contaminated by foreign materials, nor concrete that has been retempered or remixed after initial set.

J. Before depositing new concrete on or against concrete that has set at construction joints, clean, wet and apply neat cement slurry to existing surfaces. Tighten forms prior to resuming pouring.

K. Exercise care to prevent splashing of forms or reinforcing with concrete above level of concrete being placed.

L. Clean reinforcement projecting above or out of concrete immediately after completion of particular unit of pour.

M. Do not place concrete under adverse weather conditions unless adequate protection is provided. Refer to ACI 301, for weather restrictions and placing temperatures.

3.3 CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS

A. Provide construction joints when stoppage of concreting operations occurs.

B. Continue reinforcing steel across construction joints unless noted or detailed otherwise.

C. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

D. Provide vertical construction, control, and expansion joints in walls as detailed. Pour sections alternately with minimum waiting period of 48 hours between adjacent pours. Unless noted otherwise, locate joints midway between columns. Do not locate joints within 5 feet of corner, wall intersection or column. Unless noted otherwise locate vertical contraction joints in walls at 30 feet maximum spacing.

E. Special Roughened Construction Joints (SRCJ): For construction joints noted in the drawings as special roughed construction joints, in addition to keying, hardened concrete joint face shall be cleaned totally free from laitance by bush hammering or sandblasting to provide rough, sound surface with roughness amplitude not less than 1/4 inch between projecting aggregate faces and recessed sand-cement matrix.

3.4 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least 6 months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.5 FINISHING FLOORS AND SLABS

A. Finish bare concrete floors (adjacent to floors with other surfacing) so concrete surface is level with other finishes, unless otherwise noted.

B. At areas to receive floor covering, grind smooth joints between slabs on grade and structural slabs and between existing and new surfaces to eliminate unevenness and to provide smooth, level surface across joints.

C. Wetting the concrete surface during finishing operations is prohibited.

D. Power floating with troweling machines equipped with normal trowel blades is prohibited.

E. Use caution when finishing lightweight concrete slabs to maintain trowel blades at shallow angle as possible during final finishing operations.
   a. Do not provide a hard steel trowel finish to lightweight concrete slabs.

F. Protect finished surfaces from damage. Keep free of abrasive materials.

G. In areas where water will be present (interior and exterior) place and finish slabs so areas will drain and water will not stand in puddles. Conform to slopes shown. At structural slabs, verify elevations of drains to ensure drains will be at low points. Where elevations and slopes are not indicated, generally slope floors 1/8 inch per foot uniformly to drains, unless otherwise directed by Architect.

H. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot-long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed [**1/8-inch**][**3/16-inch**][**1/4-inch**].

I. General Finishing Requirements: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces as appropriate to attain slab finish specified.
   1. Wait until bleed water sheen has disappeared and concrete can sustain finishing operations employed without digging in or disrupting the levelness of the surface.
   2. Float surface with one or more passes using a power float (float shoe blades or pans) or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
   3. Uniformly slope surfaces to drains.

J. (CONC FIN-1) Hard Trowel Finish:
   1. Follow General Finishing Requirements for initial procedures.
   2. Restraighten surface if required following paste-generating float passes using 10-foot wide highway straightedge. Apply in two directions at 45 degree angle to strip. Use supplementary material to fill low spots.
   3. Consolidate concrete surface, uniform in texture and appearance, with three or more passes using power trowel. Hand trowel areas inaccessible by power trowel.

4. Grind smooth any surface defects that would telegraph through applied floor covering system.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

1. Apply to formed concrete surfaces unless indicated otherwise.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 MISCELLANEOUS CONCRETE ITEMS

A. Provide miscellaneous concrete items as noted and detailed on Drawings.

B. Provide and install reinforcing, anchors and bolts in concrete where directed and required.

C. Provide for installation of inserts, hangers, metal ties and other fastening devices required for attachment of other work.

D. Properly locate fastening devices in cooperation with other trades and secure in position before concrete is placed.

3.8 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Provide curing and protection immediately after placement in accordance with ACI 301 using materials as specified in Section 031500.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if the air temperature exceeds 80 degrees F, the wind speed exceeds 10 mph, or the relative humidity is less than 40 percent. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms are removed during curing period, immediately employ one of curing materials or methods specified for concrete surfaces not covered by forms and continue for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with no dryouts with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12 inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days with no dryouts. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   b. Moisture cure or use moisture-retaining covers on all surfaces if temperature conditions exceed 90 degrees.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    a. Cure concrete surfaces to receive floor coverings with either a curing compound or moisture-retaining cover that the manufacturer recommends for use with floor coverings. Any deleterious residual material that might affect performance of floor covering shall be cleaned from surface prior to placement of floor covering.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

E. Moisture Condition of Slabs – Following placement of concrete and climatization of building, check to see that any specified tests for moisture emission have been made and a written report submitted prior to floor covering or coating installation.

3.9 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

C. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas as determined by Architect/Engineer. Remove and replace concrete that cannot be repaired and patched to Architect's approval and in accordance with ACI 301. Repair methods for defects affecting the concrete's structural performance shall be closely coordinated between Contractor and Engineer.

B. Patching Material: Submit proposed patching materials for review and approval.

C. Preparation for Concrete Repairs:
1. Provide shoring/bracing when concrete removal will remove supporting structure or weaken structure.
2. Locate reinforcing steel in repair area using non-destructive testing. Do not damage or cut any reinforcing steel during the repair process.
3. Review extent of repairs with Architect/Engineer before proceeding.

D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, delaminations honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. After form removal, remove honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth.
2. Remove concrete within repair boundary in a manner that will not damage reinforcing steel or adjacent sound concrete materials.
3. Saw-cut or grind perimeter of areas indicated for removal to a depth of at least 3/4 inch. Do not overcut.

4. Remove additional concrete if necessary to provide a depth of removal of at least 1/2 inch or as required by patching material manufacturer over entire removal area. Avoid significant and sudden changes in depth of concrete removal.
5. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and provide at least a 3/4-inch clearance around bar.
6. The resulting shape shall be as simple as is practicable with a minimum number of corners and acute angles.
7. Remove layer of concrete weakened by interconnected microcracks caused by concrete removal with high-pressure water cleaning (5,000 to 10,000 psi) as described in SSPC-SP 12 or abrasive blasting as described in SSPC-SP 13.
8. Thoroughly clean removal areas of loose concrete, dust, and debris
9. Dampen repair area and surrounding concrete 6 inches beyond repair area and then remove standing water. Maintain substrate in a saturated surface dry condition.
10. Apply mortar scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar.
11. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch.
12. Place material in a single lift not exceeding the manufacturer's recommended thickness. If multiple layers are required due to manufacturer's recommendations or job-site conditions, provide rough finish on first layer to promote bonding of subsequent applications.
13. Allow surfaces of lifts that are to remain exposed to become firm and then finish to match and blend with adjacent concrete.
14. Moist cure for at least 7 days or as recommended by the repair material manufacturer. Use of curing compounds is prohibited.

E. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching material will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

F. Repair defects and fill tie holes on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

G. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching material. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
   5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove concrete within repair boundary in a manner that will not damage reinforcing steel or adjacent sound concrete materials.
      a. Saw-cut or grind perimeter of areas indicated for removal to a depth of at least 3/4 inch. Do not overcut.

b. Remove additional concrete if necessary to provide a depth of removal of at least 1/2 inch or as required by patching material manufacturer over entire removal area. Avoid significant and sudden changes in depth of concrete removal.
c. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and provide at least a 3/4-inch clearance around bar.
d. The resulting shape shall be as simple as is practicable with a minimum number of corners and acute angles.
e. Remove layer of concrete weakened by interconnected microcracks caused by concrete removal with high-pressure water cleaning (5,000 to 10,000 psi) as described in SSPC-SP 12 or abrasive blasting as described in SSPC-SP 13.
f. Thoroughly clean removal areas of loose concrete, dust, and debris
g. Dampen repair area and surrounding concrete 6 inches beyond repair area and then remove standing water. Maintain substrate in a saturated surface dry condition.
h. Apply mortar scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar.

i. Place patching concrete by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch.
j. Place material in a single lift not exceeding the manufacturer's recommended thickness. If multiple layers are required due to manufacturer's recommendations or job-site conditions, provide rough finish on first layer to promote bonding of subsequent applications.
k. Allow surfaces of lifts that are to remain exposed to become firm and then finish to match and blend with adjacent concrete.
l. Moist cure for at least 7 days or as recommended by the repair material manufacturer. Use of curing compounds is prohibited.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching material before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

H. Repair materials and installation not specified above may be used, subject to Engineers's approval.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage qualified special inspectors in accordance with Section 014533.
1. Qualifications: The minimum category of special inspector required to perform services outlined below are noted by qualifications in parentheses. The definitions of the categories of special inspector are included in Section 014533.
2. Certifications: Testing Laboratory shall have CCRL certification of the National Bureau of Standards.

B. Coordinate with independent testing and inspecting agency engaged by the Owner to perform field quality control inspection and testing.
1. Provide necessary scaffolding or temporary platforms required by testing agency in order to perform their work. Such scaffolding or platforms shall comply with safety regulations and shall be acceptable to testing agency.
2. Certifications: Testing Laboratory shall have CCRL certification of the National Bureau of Standards.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

D. On a periodic basis, perform concrete mix verification.
1. Verify mixer truck trip ticket conforms to approved mix design.
2. Verify that total water added to mix on site does not exceed that allowed by concrete mix design.

3. Verify that concrete quality is indicative of adequate mixing time, consistency and relevant time limits.

E. Sample and test all cast-in-place concrete.
   1. Make, cure and determine strength of concrete test cylinders cast in field. Perform in accordance with ASTM C172 - Practice for Sampling Freshly Mixed Concrete, ASTM C31 - Practice for Making and Curing Concrete Test Specimens in the Field and ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens. Evaluation and acceptance of concrete shall be in accordance with ACI 318 with following exceptions:
      a. Make one set of cylinders for each day's operation and each type of concrete where less than 50 cubic yards is placed, plus additional sets for each 100 cubic yards (or fraction thereof) over and above first 50 cubic yards of each type.
         1) Test sets shall consist of 4 cylinders with fourth cylinder to be field-cured specimen.
         2) For slabs placed when temperatures are expected to fall below 32 degrees F within 72 hours of placement, cast-in-place (pop out) cylinders shall be used.
         3) These cylinders shall be placed close to corners and perimeter of pour.
      b. Store field-cured cylinder as near as possible to location of concrete represented by sample and give cylinder, insofar as practicable, same protection and curing as adjacent concrete.
         1) Keep other 3 cylinders covered with plastic or wet burlap and in 60 - 80 degrees F temperature range for 24 hours, allowing no injury to cylinders.
         2) After this period, and prior to age of 48 hours, deliver 3 cylinders to laboratory for additional curing, taking care not to freeze, crack or damage specimens.
      c. Deliver field-cured cylinder to laboratory at 28 days of age for testing to check adequacy of curing and protection as described in ACI 318.
      d. Test other 3 cylinders, laboratory cured, as follows: One at 7 days of age for projecting probable 28 day strength and 2 cylinders at 28 days for acceptance of average strength as described in ACI 318.
      e. If additional field cured specimens are required to verify early strength of concrete, contractor must pay for additional testing.
   2. Determine slump of concrete in accordance with ASTM C143 - Test Method for Slump of Hydraulic Cement Concrete. Perform one test for each set of test cylinders.
   3. Determine air content of fresh concrete, when air content is specified, in accordance with ASTM C173 or ASTM C231. Where placement is by pump, air content shall be measured at location of placement. Perform one test for each set of test cylinders. Concrete used in performing air content test shall not be used in fabricating test specimens.
   4. Make, transport, and cure specimens as required to determine unit weight of structural lightweight concrete in accordance with ASTM C567 - Test Method for Unit Weight of Structural Lightweight Concrete. Perform one test for each day's operation where less than 50 cubic yards is placed, plus additional set for each 100 cubic yards (or fraction thereof) over and above first 50 cubic yards.
   5. Test concrete temperature hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and each time a set of test cylinders is made.
   6. Mark each test cylinder with job name, Contractor's name, mix number, date, location of pour and measured slump. In addition, mark measured air content when air-entraining admixture is specified.
   7. Submit copies of test results to Owner, Architect and Contractor as soon as practicable after they are made.

F. On a continuous basis, inspect preparation and placement of all concrete.
   1. Verify acceptable general condition of concrete base prior to placement.
   2. Verify that concrete conveyance and depositing avoids segregation and contamination.
   3. Verify that concrete is properly consolidated.
   4. Verify reinforcement remains at proper location.
   5. Verify underfloor vapor barrier/retarder is properly installed and not damaged during concrete placement.

G. On a periodic basis, observe protection and curing methods for all concrete.
   1. Verify specified curing procedures are followed.
   2. Verify that specified hot and cold weather procedures are followed.

H. On a continuous basis, inspect all embedded anchors installed in concrete.
   1. Verify specified size, type, spacing, configuration, embedment and quantity.
   2. Verify proper concrete placement and consolidation around all embedded anchors.

3.12 EVALUATION OF TEST RESULTS AND FAILURE TO MEET STRENGTH REQUIREMENTS

A. Test results: Evaluate in accordance with ACI 214.

B. Evaluations shall be valid only if samples have been taken and tests have been conducted in accordance with ACI and ASTM specifications and methods as applicable.

C. If strength tests performed on concrete cylinders, cast at time concrete is placed, fail to meet specified 28 day values, or if samples have not been taken and tests conducted as specified, concrete represented by such samples and tests shall be considered questionable and shall be subject to further testing at expense of Contractor.

D. These additional tests of questionable concrete shall be performed by Independent Testing Laboratory, acceptable to Architect, and shall be conducted in accordance with ASTM C42. Concrete cores may be obtained in field, or load tests conducted and results evaluated in accordance with ACI 318.

E. Test results obtained by use of impact hammer or sonoscope, unless correlated with other data, will not be considered conclusive in evaluating strengths of concrete.

F. If additional testing fails to demonstrate strengths adequate for intended purpose of member or members in question, as determined by Architect, remove questionable concrete and replace with concrete meeting specifications.

END OF SECTION

SECTION 057005
LANDSCAPE METALWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide all labor, materials and equipment as required for complete, finished installation of metalwork as shown on the drawings and specified including the following items:
   1. Railings, Guardrails, and Decorative (Non Chain-Link) Fences
   2. Miscellaneous landscape metal

B. Metal fabrication includes plates, bars, strips, tubes, pipes and castings made from iron and steel that are not specifically listed herein.

1.2 REFERENCES AND STANDARDS

A. "Code for Arc and Gas Welding in Building Construction" of American Welding Society, AWSD1.1, latest edition, with current supplements and addenda, is hereby made a part of this Section and miscellaneous metalwork shall conform to the applicable requirements therein, except as otherwise specified herein or shown on the drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements or governing rules and regulations.

B. All work shall conform to the American Institute of Steel Construction Specifications for design, erection and fabrication, and acceptable standards of good practice. Finished members shall be true to line and free from twists and bends.

C. SSPC "Steel Structures Painting Manual, Volume 2, Systems and Specifications".

D. National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature including paint, grout and recommendations for cleaning.

B. Shop Drawings: Submit shop drawings as required. Shall show dimensions, sizes, thicknesses, gauges, finishes, joining attachments and relationship of work to adjoining construction. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from drawings. Where concrete, masonry or other materials must be set to exact locations to receive work, furnish assistance and directions necessary to permit other trades to properly locate their work. Where welded connectors, concrete or masonry inserts are required to receive work, shop drawings shall show exact locations required, and all such drawings shall be furnished to the trades responsible for installing the connectors or inserts. Catalogue work sheets showing illustrated cuts of item to be furnished, scale details and dimensions may be submitted for standard manufactured items.
   1. Provide templates for anchorage installations by others.

C. Samples: Furnish finish samples of uncoated steel anchor and bolts for farm machinery, etc.

D. Certificates: Submit certification signed by California registered civil or structural engineer indicating compliance with Contract Documents and code requirements where required.

1.4 SYSTEM DESCRIPTION

A. Design Requirements: Drawings indicate metal sizes and shapes; unless otherwise specifically indicated, design components and fabrications of gages and thicknesses to withstand anticipated loads as required by California Building Code.
   1. Railings: Support a lateral force of 50 lbs./lin. Ft. uniform load and 200 lbs. at any single point without permanent set or damage; ASTM E 935.

a. Top Rails: Design to support minimum 200 lb. concentrated single point load applied at any point vertically or horizontally.

B. Rail Regulatory Requirements:
   1. Access: Comply with California Building Code and Americans with Disabilities Act Accessibility Guidelines (ADAAG) Access Requirements and finishes as designated by NAAMM "Metal Finishes Manual" and "Pipe Railing Manual" and referenced standards. Rails shall be welded construction; cap exposed ends.
   2. Building Code: Comply with requirements of applicable building codes for railing design, except where more restrictive codes are specified.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm with minimum five years successful experience fabricating metal items similar to those required for Project.

PART 2 - MATERIALS

2.1 BASIC MATERIALS AND ACCESSORIES

A. Steel Tubing: ASTM A500 (cold-formed), Minimum Grade B, seamless where exposed.

B. Steel Pipe: ASTM A53, Type S, seamless, Grade A, minimum standard weight, STD or Schedule 40, unless otherwise noted.

C. Miscellaneous steel plates and structural steel shapes conforming to ASTM A36-(latest edition).

D. Bolts: Structural grade steel, ASTM A307-(latest edition), with suitable hex nuts and washers, all galvanized except where noted otherwise.

E. Structural Steel Sheet: Hot rolled, ASTM A1011; or cold rolled, ASTM A 1008, Class 1 of grade required for design loading.

F. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

G. Fasteners and Rough Hardware: Type as required for specific usage; provide zinc-coated fasteners for exterior use or where built into exterior walls.

H. Welding Materials: AWS D1.1, type required for materials being welded.

I. Stainless Steel
   1. Plate, Sheet and Strip: ASTM A167, Type 304. Provide mill finish unless otherwise shown.
   2. Bars and Shapes: ASTM A276, Type 304. Provide mill finish unless otherwise shown.
   3. Tubing: ASTM A269
   4. Stainless Steel Railing Finishes: Submit finish sample for approval. Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated free of cross scratches. Run grain with long dimension of each piece.
   5. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

J. Screws: Galvanized zinc, electro-plated, brass, or stainless steel (as noted on drawings),

K. Welding Electrodes: As permitted by AWS A5.

L. Galvanizing:
   1. Galvanize fabricated items as shown and specified after fabrication in accordance with ASTM A123-09.

2. Parts shall be made in suitable sections. First clean in a hot pickling bath to remove scale and then rinse clean with clear water. After pickling and washing, dip parts in liquid zinc tank sufficient length of time to heat parts to zinc temperature, then remove and allow to drip and cool; straighten as required.

M. Non-Metallic Shrinkage Resistant Grout: Premixed, nonmetallic, non-corrosive, non-staining, shrinkage resistant product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621 and ASTM C1107, free of gas-producing or gas-releasing agents, oxidizing catalysts, inorganic accelerators and chlorides. Provide one of the following:
   1. "Five Star Grout" (U.S. Grout Corp.).
   2. "Masterflow 713" (Master Builders Co.).
   3. "Crystex" (L&M Construction Chemicals, Inc.).

N. Fasteners and Anchorage Devices: Provide fasteners complying with the requirements of Industrial Fasteners Institute standards. Type, grade, class and style best suited for the respective purpose. Use countersunk flat-head Phillips type machine screws for exposed fasteners, except where Allen head screws are required. Use galvanized steel or stainless steel fasteners for exterior construction and for fastening components fabricated of galvanized steel except where specified otherwise. Fasteners exposed in finish surfaces to match finish of adjacent surfaces.

O. Component Connections: Fabricate component connections to support specified design loads.

P. Material Selection: Select materials for straightness, free of defects and irregularities.
   1. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, “oil canning”, stains, discolorations, and imperfections on finished units are not acceptable.

Q. Joints: Make exposed joints flush butt type, hairline joints where mechanically fastened; provide concealed connection devices with hidden fasteners.
   1. Fabricate continuous items with joints neatly fitted and secured.
   2. Ease exposed edges to approximate 1/32” uniform radius.
   3. Fabricate joints exposed to weather in manner to exclude water or provide weep holes where water could accumulate.

R. Welding: Comply with AWS for recommended practices in welding each type of material; provide welds behind finished surfaces without distortion or discoloration on exposed side; dress exposed and contact surfaces.

S. Exposed Mechanical Fastenings: Flush countersunk fasteners unobtrusively located, consistent with design of structure.

T. Assemblage: fit and shop assemble in largest practical sections for site delivery.

U. Dissimilar Materials: Separate dissimilar materials with bituminous paint where concealed, with preformed separators, or similar method to prevent corrosion.

2.2 SHOP PAINTING

A. General:
   1. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded unless otherwise specified.
   2. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning", prior to any additional surface preparation specified.
   3. Clean and prepare metal surfaces before applying shop coat. Remove rust and mill scale in accordance with SSPC SP-3 "Power Tool Cleaning".
   4. Immediately after surface preparation, apply primer in accordance with manufacturer's instructions. Use painting methods which will result in full coverage and dry film thickness specified.

5. Apply one shop coat of primer to fabricated metal items, except apply 2 coats of primer to surfaces inaccessible after assembly or erection. In addition, apply one shop coat of finish paint to entire surfaces of exterior loose lintels, shelf and relieving angles, dunnage and other items as noted or specified. Change color of second or finish coat to distinguish it from the first coat.
6. Separate dissimilar metals with one coat of dielectric separator. Do not extend coating onto exposed or finished surfaces.
7. Application: Do not paint when ambient temperature is below 40°F. Paint in dry weather or under cover; paint over dry rust-free surfaces. Stir paint and keep at uniform consistency during application. Apply paint by brush or spray per manufacturer's directions to a dry film thickness of not less than 1.5 mils (approximately 370-375 SF of surface per gallon); do not thin paint in excess of manufacturer's recommendations. Allow paint to dry before handling or shipment.

B. Fully Concealed Items:
1. Clean steel work by "Solvent Cleaning" method specified in SSPC-SP 1, followed by "Hand Tool Cleaning" to remove loose mill scale and rust by methods specified in SSPC-SP 2.
2. Apply ferrous metal primer immediately after cleaning to uniform dry film thickness of 2.0 mils.
3. Apply second coat of same primer and same thickness on concealed work which will be built into below grade work, or will be concealed in areas designated high humidity areas.

C. Exposed Exterior Items:
1. Apply the following cleaning, treatment and painting to exterior work which will be fully exposed or only partially exposed, and to exposed interior work in areas designated as high humidity areas.
2. Clean by "Solvent Cleaning" method specified in SSPC-SP 1, followed by "Power Tool Cleaning" to remove loose mill scale and rust by methods specified in SSPC-SP 3, followed by "Pickling" to remove remaining mill scale and rust by methods specified in SSPC-SP 8. Power tool cleaning and pickling may be omitted from work fabricated from cold-rolled or cold-finished stock, and from castings, provided surfaces are not heavily rusted.
3. Apply pretreatment as recommended by ferrous metal primer manufacturer.
4. Apply prime coat of ferrous metal primer immediately after pretreatment to uniform dry film thickness of 2.0 mils.

2.3 FINISHES: Except as otherwise noted on the drawings or specified:

A. Preparation of Metal:
1. Ferrous Metal: SSPC-SP-6 (Commercial Blast Clean)
2. Galvanized Metal: SSPC-SP-1 (Solvent Clean)
3. Cut or Welded Galvanized Metal: Surface clean cuts and welds to bright metal
4. Aluminum: SSPC-SP-1 (Solvent Clean)

B. Primer:
1. Ferrous Metal: Tnemic 90-97 (Tneme-Zinc)
2. Galvanized Metal: Tnemic Series P66 Epoxoline
3. Cut or Welded Galvanized Metal: Paint with organic ZMC rich primer with a metallic zinc content of not less than 78% by weight in dry applied film Tnemic-zinc 90E-92 or approved equal. Apply in dry film thickness between 2.0 - 3.5 mils.
4. Aluminum: Tnemic Series 66 Epoxoline

C. Finish Coats:
1. Interior: Tnemic Series (73) or (74) Endura-Shield
2. Exterior: Tnemic Series 74 Endura-Shield
3. Heavy duty Industrial Use: Tnemic Series 74 Endura-Shield

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES: Inspect all surfaces to receive site metal work and report all defects which would interfere with this installation. Starting work implies acceptance of surfaces as satisfactory.

3.2 FIELD MEASUREMENTS: Take field measurements prior to preparation of shop drawings and fabrication, where possible; do not delay job progress; allow for trimming and fitting where necessary.

3.3 WORKMANSHIP

A. Verify all measurements at job. Coordinate all metalwork with adjoining work for details of attachments, fittings, etc. Do all cutting, shearing, drilling, punching, threading, tapping, etc., required for site metalwork or for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces. Obtain Owner's Representative's review prior to site cutting or making adjustments which are not part of scheduled work. Perform necessary cutting and altering for installation and coordination with other work.

B. Conceal all fastenings where feasible. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.

C. Make all permanent connections in ferrous metal surfaces using welds where at all possible; do not use bolts or screws where they can be avoided.

D. Provide all lugs, clips, anchors, miscellaneous fastenings necessary for complete assembly and installation.

E. Set all work plumb, true, rigid, neatly trimmed out, accurately fitted and free from distortions or defects detrimental to appearance or performance. Miter corners and angles of exposed moldings and frames unless otherwise noted.

F. Set railings where shown set in sleeves or cored with quick-setting non-shrink anchor cement. Size sleeves for approximately 1/4" clearance all around.

G. Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient time that progress of work is not delayed. Be responsible for proper location of such items.

H. Make provisions for erection stresses by temporary bracing; Keep work in alignment.

I. Install ornamental metal items in accordance with manufacturer's recommendations, installation instructions, and approved shop drawings.

J. Install items plumb, true and in correct relation to adjacent work, free from distortion or defects detrimental to appearance and performance.

K. Prior to securing continuous items, adjust to ensure proper matching at butt joints and correct alignment throughout their length.

L. Tolerances: Accurately align and locate components to required lines and levels to conform to following tolerances:

1. Plumb: 1/8" in 10'-0"; ¼" in 40'-0"; non-cumulative.
2. Level: 1/8" in 20'-0"; ¼" in 40'-0"; non-cumulative.
3. Location: 3/8" maximum deviation from measured theoretical location (any member and location).

3.4 WELDING:

A. Perform all welding in accordance with AWS Code D1.1. Welds shall be made only by operators experienced in performing the type of work indicated. Welds normally exposed to view in the finished work shall be uniformly made and shall be ground smooth. Where welding is done in proximity to glass or finished surfaces, such surfaces shall be protected from damage due to weld sparks, spatter, or tramp metal.

B. Field Welding: Comply with AWS Welding Code for procedures related to field welding as related to appearance and quality of welds made and for methods used in correcting welding work. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.5 BOLTED, SCREWED AND RIVETED CONNECTIONS

A. In general, use bolts for field connections only and then only as detailed. Provide washers under all heads and nuts bearing on wood. Draw all nuts tight and nick threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surfaces.

B. Where screws must be used for permanent connections in ferrous metal, use flat-head-type, countersunk, with screw slots filled and finished smooth and flush.

C. Where rivets are used, they shall be machine-driven, tight, heads centered, countersunk, and finished flush and smooth.

3.6 SURFACE TREATMENT AND PROTECTIVE COATINGS

A. Cleaning: Thoroughly clean all mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to any galvanizing, hot phosphate treatment or painting. Conditions which are too severe to be removed by hand cleaning methods shall be cleaned per SSPC "Surface Preparation Specifications," "Solvent Cleaning, SSPC-SP-1"; "Power Tool Cleaning, SSPC-SP-3"; or "Brush-Off Blast Cleaning, SSPC-SP 7"; as required.

B. Exterior Ferrous Metal: Welds, burrs, and rough surfaces ground smooth and completed assembly cleaned, hot phosphate treated. Hot phosphate treatment not required on items which are not exposed in the finish work or on those items where size prohibits such treatment. Indicate on shop drawings where treatment is proposed to be omitted.

3.7 PAINTING

A. Prime Coat: After material has been properly cleaned and treated, apply two shop prime coats, each of a different color, to all surfaces except those encased in concrete or masonry. Apply all paint per manufacturer's directions. Spot paint all abrasions and field connections after assembly. Shop coats shall be dry prior to shipment to job site.

B. Finish Coats: Apply one coat per manufacturer's instructions. May be shop-applied where applicable.

3.8 GALVANIZING

A. Galvanize fabricated items after fabrication in accordance with ASTM A123-66.

B. Parts shall be made in suitable sections. First clean in a hot pickling bath to remove all scale and then rinse clean with clear water. After pickling and washing, dip parts in liquid zinc tank sufficient length of time to heat parts to zinc temperature, then remove and allow to drip and cool; straighten as required.

3.9 INSTALLATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts and other miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the project site. Deliver items which are to be built into the work of other Sections in time so as not to delay the progress of the Work.

B. Protect finished surfaces against damage during construction and remove protection at time of substantial completion.

C. Railings and Guardrails:

1. Anchor posts of railings into concrete by means of pipe sleeves preset and anchored into concrete. Set sleeves in concrete with tops flush with finish surface elevations and protect sleeves from water and concrete entry. After posts have been inserted into sleeves, solidly fill annular space between post and sleeve with non-shrink non-metallic grout. Cover anchorage joint with a round steel flange welded to post after placement of anchoring material.
2. Anchor posts to steel members with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.
3. Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements. Mount handrails only on gypsum board assemblies reinforced to receive anchors. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Locate posts at spacing indicated, or if not indicated, at equal intervals as required by design loadings.
4. Secure handrails to wall with wall brackets and end fittings. Provide brackets of design shown, with flanges tapped for concealed anchorage and with not less than 1-1/2 in. clearance from inside face of handrail and finished wall surface. Located brackets as indicated, or if not indicated, at equal spacings as required by design loads.

D. Loose Plates: Prior to setting loose bearing and setting plates, clean concrete and masonry bearing surfaces of any bond reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates. Set on wedges or other adjustable devices. After members have been positioned and plumbed, tighten anchor bolts. do not remove wedges or shims, but if protruding, cut off flush with the edge of the plate before packing with grout. Pack grout solidly between bearing surfaces and plates to ensure no voids remain.

E. Immediately after erection, clean field welds, bolted connections, marred and abraded surfaces. Paint and touch-up paint with the specified paint system. Touch up galvanized surfaces in accordance with ASTM A780.

F. Replace items damaged in course of construction.

3.10 PROTECTION AND CLEANING

A. Remove all soil and foreign matter from finished surface and apply such protective measures as may be required to prevent damage or discoloration of any kind until acceptance of project.

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Miscellaneous wood framing.
2. Concealed wood blocking and nailers.
3. Wood furring and grounds.
4. Concealed sheathing.
5. Subflooring,
6. Underlayment.
7. Air barrier, and vapor retarder in connection with wood framing.
8. Anchors nails, bolts, and screws.
9. Rough in for contractor installed and operator furnished and installed toilet accessories

B. Related Sections:

1. Section 010000 – General Requirements.
2. Section 064000 - Architectural Woodwork.
3. Section 079000 – Joint Protection.
4. Section 085313 – Vinyl Windows.
5. Section 099000 – Painting.
6. Section 102813 – Toilet Accessories.

1.2 DEFINITIONS

A. The following definitions apply to this section as they pertain to rough carpentry items.

1. Rough Carpentry: Carpentry work not specified in other Sections and not used as exposed work.

1.3 DESCRIPTION

A. Concealed wood framing, blocking, sheathing, subflooring, underlayment, anchors, fasteners, adhesives, and related items, including accessories furnished and installed as specified herein.

1.4 SUBMITTALS

A. Product Data: Submit for carpentry in accordance with Section 013300, Submittals.

1. Submit for sheathing, air infiltration barrier, vapor retarders, tapes, sealants, and miscellaneous products specified.

B. Certification:

1. Submit letter certifying that lumber is kiln-dried to 15 - 19 percent moisture content, well seasoned, grade marked, trade marked and free from warp.
2. Submit letter from treatment plant certifying that chemicals and process used and net amount of salts retained are in conformance with specified standards
3. Submit letter certifying that fire-retardant treatment materials comply with requirements herein stated and local authorities having jurisdiction and that treatment will not bleed through finished surfaces.

1.5 QUALITY ASSURANCE

A. Lumber Standard:

1. Comply with U.S. Dept. of Commerce Product Standard PS 20, including moisture content and actual sizes related to indicated nominal sizes.
2. Comply with Standard Grading Rules No. 16 for West Coast Lumber.

3. Comply with American Softwood Lumber Standard and with application grading rules of inspection agencies certified by American Lumber Standard Committee's (ALSC) Board of Review.
4. Comply with lumber producer's inspection agency grading rules certified as conforming to "National Grading Rules for Dimension Lumber" established under Section 10 of PS 20 and local code standard.

B. Plywood Standard: Comply with U. S. Product Standard PS 1-74/ANSI A199.1; and Grades and Specifications, Performance-Rated Panels and Specifications by APA – The Engineered Wood Association local code standard. Each construction and industrial panel shall bear APA trademark and appropriate identification.

C. Mat-Formed Particleboard: Comply with ANSI A208.1. Provide particleboard bearing NPA grade marking.

D. Lumber: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying agency, grade, species, moisture content at time of surfacing and mill.
1. Seasoning: Kiln-dry lumber to 15 - 19 percent moisture content, well-seasoned, grade marked, trade marked and free from warp.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inspect wood materials for conformance to specified grades, species, and treatment at time of delivery to Project site.
1. Reject and return unsatisfactory wood materials.

B. Provide facilities for handling and storage of materials to prevent damage to edges, ends and surfaces.

C. Keep carpentry materials dry.
1. Store lumber and plywood in stacks with provision for air circulation within stacks.
2. Protect bottom of stacks against contact with damp surfaces. Protect exposed materials against weather.
3. Stack materials minimum 12 inches off ground, or if on concrete slab-on-grade, minimum 1-1/2 inches, fully protected from weather.
4. Provide for air circulation within and around stacks and under temporary coverings.

D. Place spacers between each bundle of pressure treated materials treated with waterborne chemicals to provide air circulation.

1.7 PROJECT CONDITIONS

A. Environmental Impact: Products containing following materials will not be permitted:
1. Urea Formaldehyde.
2. Chromium in wood pressure treatment products.
3. Arsenic.

1.8 COORDINATION

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit, show location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.
1. Coordinate work directly with other subcontractors as necessary to insure proper fitting, joining or to clearances of other work. Obtain templates as required to insure proper fitting.

PART 2 PRODUCTS

2.1 LUMBER

A. Dimension Lumber: Finished 4 sides, 15 percent maximum moisture content. Mark lumber "S-DRY".

1. Light Framing: Construction grade Douglas Fir or Southern Pine, appearance grades where exposed.
2. Boards: Construction grade.

B. (WD BLKG-1) Miscellaneous Lumber: Lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping and similar members.
1. Moisture content of 19 percent maximum for lumber items not specified to have wood preservative treatment.
2. Grade: No. 3 or standard grade.

2.2 WOOD SHEATHING

A. Provide materials that do not contain added urea formaldehyde.

B. (WD SHTG-4) Concealed Sheathing: OSB, Structural 1, Exposure 1 sheathing, 5/16 inch thickness for 16 inch stud spans, 3/8 inch thickness for 24 inch stud space.

C. (WD SHTG-6) Roof Sheathing: APA EXT, C-D Exposure Exterior, 3/4 inch, square edge, Douglas Fir.

D. (WD SHTG-7) Floor Sheathing: APA INT, C-D with intermediate glue, unsanded, tongue and groove edge, thickness shown, Douglas Fir.

2.3 SUBFLOOR AND UNDERLAYMENT

A. (WD SHTG-13) Subflooring: Particleboard, grade 2-M-W; 5/8 inch thickness for 16 inch span; ¾ inch thickness for maximum 19.2 inch span.

B. (WD SHTG-14) Underlayment: APA, INT, underlayment with exterior glue.

C. (WD SHTG-20) Stair Treads: Particleboard treads grade 1-M-1; 3/4 inch minimum thickness, maximum 30 inch span.

2.4 INSULATION BOARD SHEATHING

A. (IBS SHTG-1) Extruded Polystyrene Foam Wall Sheathing: ASTM C578, Type IB, standard lengths and widths with tongue and groove or shiplap long edges as required for intended use.

B. (IBS SHTG-2) Polyisocyanurate Foam Wall Sheathing: Aluminum-foil faced, glass-fiber reinforced, rigid, cellular, polyisocyanurate thermal insulation complying with ASTM C1289, Type I, Class 2.
1. Foam plastic core and facings with flame-spread index of 25 or less when tested individually.

2.5 AIR INFILTRATION BARRIER

A. (AB-1) Air Barrier: Air retarder complying with ASTM E1667; made from polyolefins; either cross laminated films, woven strands, or spun bonded fibers; coated or uncoated; with or without perforations to transmit water vapor but not liquid water.
1. Minimum Thickness: 3 mils, minimum water vapor transmission, 10 perms when tested in accordance with ASTM E96, Procedure A, Maximum flame spread, 25 per ASTM E84.
2. Product:
   a. Tyvek Commercial Building Wrap with weatherization systems with contractor's tape by DuPont, or acceptable equal for use in connection with wood sheathing.
      1) Staples: Corrosion-resistant type.

2.6 ASPHALT-SATURATED FELTS

A. (AF-1) No.15 Asphalt-Saturated Felt: ASTM D226 Type I (11.5 to 12.5 lbs.), non-perforated.

B. (AF-2) No.30 Asphalt-Saturated Felt: ASTM D226 Type II (26.4 to 27.3 lbs.), non-perforated. (AF-1) Asphalt Building Paper: Asphalt saturated felt, Type I, ASTM D226; No. 15 unperforated asphalt felt.

2.7 BUILDING PAPER

A. (BP-1) Kraft Building Paper: Water-vapor-permeable, asphalt-saturated kraft building paper in compliance with FS UU-B-790, Type I, Grade D, Style 2; with water-resistance rating not less than 60 minutes per ASTM D 779.
   1. Product: Premier Fortifiber Super Jumbo Tex 60 Minute, by Fortifiber, or approved equal.
   2. Physical and Performance Properties:
      a. Moisture Vapor Transmission: 35 grams minimum; ASTM F 1249.
      b. Water Resistance: 60 minutes minimum (premier); ASTM D 779.

2.8 VAPOR RETARDER

A. (VR-1): 6.0 mil thick polyethylene film with vapor retarder transmission rating of 0.20 perms or less.

2.9 ROUGH HARDWARE, FASTENERS AND ANCHORAGE DEVICES

A. Extent: Provide rough hardware required, including nails, screws, bolts, lag screws, cinch anchors, toggle bolts, shot anchors and similar items.
   1. (Joist Hangers: Sized and profiled to suit applications, galvanized.)

B. General: Provide proper size and type for use intended and for materials to be fastened.
   1. Install adequate hardware to insure substantial and positive anchorage.
   2. Use galvanized for exterior locations and high humidity locations and treated wood, plain finish for other interior locations.
   3. Fasteners, hangers and bearing plates used on or in connection with treated wood shall comply with IBC 2304.9.

C. Nails: Conform to materials standards established under FS FF-N-105.
   1. At exterior work, use galvanized steel nails.
   2. Refer to IBC Nailing Schedule for quality and size.

D. Fasteners for Wood Wall Bumpers:
   1. Concrete and Masonry walls: 5/8 inch diameter by 5-1/2 inch (minimum) hooked bolts with heavy flat washers, lock washer and hex head nut - flush fill concrete masonry block cavities with concrete to 24 inch (minimum) for single bumper and 48 inch (minimum) for double bumpers.
   2. Metal Stud Wall: 1/2 inch diameter (minimum) toggle bolts plus a continuous 14 gauge metal plate backing welded to metal studs.

E. Mechanical Fasteners for Wood Decking: Swaneze stainless steel decking screws.

2.10 ROOF VENTS

A. (RV-1): Ridge Vents: Continuos roof vent at peak of roof.
   1. Product: SurVent Ridge Vents by Owens Corning

B. (RV-3) Soffit Vents: Aluminum soffit vents and strips with screens and baffles vents as indicated.
   1. Width: As indicated
   2. Open Area: 50 percent
   3. Products:
      a. Perimeter Systems, Div of Southern Aluminum Finishing Company: Type 4
      b. Fry Reglet Company Aluminum Soffit Vents.

C. (RV-4) Vents: Vinyl soffit vents and strips with screens and baffles vents as indicated.
   1. Width: As indicated
   2. Acceptable Manufacturers:
      a. Vinyl Soffit Vent by AMICO (Alabama Metal Industries).
   3. Painted finish in color selected by Architect.

2.11 TAPES, SEALANTS AND MISCELLANEOUS

A. Adhesive: As recommended by manufacturer of product to be applied for surface material to give permanent adhesion, with material remaining flat to back surface. Comply with local code standards.
   1. Comply with APA AFG-01 for adhesive for use with type of construction panel indicated.
   2. Exterior: Phenolic resin waterproof glue.
   3. Interior: Water-resistant casein and other adhesives suited for particular use.

B. Expansion Material: Dow Chemical Ethafoam. Use where expansion joint material is indicated and not installed under other sections.

C. Concealed Sealants: Polyisobutylene sealant
   1. Tremco's Curtainwall Sealer.

D. Soft Gasket or Urethane Insulation:
   1. Product: Ester 72PP from American Convertors; flexible semi- closed cell urethane.
      a. Distributor: Brock-White Company, Minneapolis, Minnesota.
   2. Provide 1/2 inch thicker than joint where foam tape, foam gasket and urethane insulation is indicated and not provided under other sections.
   3. Location: At gaps between framing and other materials.

E. Expanded Closed-Cell Filler (ECCF-1):
   1. Product: Everlastic NN-1, 1040 Series from Williams Products, Inc.; flexible closed-cell sponge rubber, with blend of neoprene, EPDM, and SBR.
      a. Compression/Defection at 25 percent deflection: 2 to 5 pounds per square inch.
      b. Elongation: 150 percent.
      c. Ultimate tensile strength: 75 pounds per square inch.
      d. Distributor: Brock-White Company, Minneapolis, Minnesota.
   2. Field cut to thickness, width, and length where foam tape, foam gasket and urethane insulation is indicated and not provided under other sections.
   3. Location:
      a. Expansion joint filler in masonry and concrete.
      b. Filler support sealant in traffic bearing joints.
      c. Gaps between open web joists or beams and gypsum board surfaces.

F. Sill Sealer Gaskets:
   1. Glass-fiber resilient insulation, fabricated in strip form for use as a sill sealer.
   2. Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 EXECUTION

3.1 ROUGH IN FOR WALL MOUNTED ACCESSORIES

1. Provide rough in framing for contractor installed and operator furnished and installed toilet accessories

3.2 FRAMING, NAILERS, BUCKS, CANT STRIPS

A. Install plumb, level, true and square to dimensions shown and required. Allow for finishes and proper clearances where necessary.

B. Provide sound bearing, square cuts, and full bearing surfaces. Set crown up for horizontal members. Shim and block where required.

C. Eliminate crooked, twisted, cupped or bowed framing where required.

D. Anchorage: Adequately anchor, fasten and support members to form secure, substantial and accurate anchorage and to hold required dimensions and prevent twist.
   1. Use bolts and screws to eliminate loosening up of joints, sagging or similar movement.
   2. Use nailers for securing gravel stops, cornices, and where otherwise shown or required.

3.3 FURRING, STRIPPING, GROUNDS AND BACKING

A. Install plumb, level, true and square. Anchor substantially for permanent installation. Set and shim to straight edge so finish wall is true and straight.

B. Provide grounds and backing as shown or required. Blocking as required or shown on drawings for plumbing fixtures, brackets, drapery rods, window and door frames, built-in furniture and other woodwork, both interior and exterior.

C. Allow for finishes and shim out to form level surfaces. Verify ground sizes and locations before installation.

3.4 INSTALLATION OF SHEATHING

A. Install plywood in accordance with Plywood Construction Guide by APA – The Engineered Wood Association.

B. Place roof and wall sheathing with end joints staggered. Secure sheets over firm bearing.

1. Maintain minimum 1/16 inch and maximum 1/8 inch spacing between joints on walls. Place perpendicular to framing members.

C. Comply with roofing manufacturer's requirements for sheathing attachments.

3.5 SUBFLOORING

A. Place subflooring with end joints staggered. Secure sheets over firm bearing. Maintain surface flatness of maximum 1/8 inch in 10 feet or more.

3.6 AIR INFILTRATION BARRIER (BUILDING PAPER)

A. Cover sheathing with air infiltration barrier (building paper).

1. Apply air infiltration barrier to comply with manufacturer's written instructions. Apply to cover upstanding flashing with 4-inch overlap.
2. Apply asphalt-saturated organic felt horizontally with 2-inch overlap and 6 inch end lap; fasten to sheathing with galvanized staples or roofing nails.

3.7 PARTICLEBOARD

A. Where acceptable to governing authorities, particleboard may be used for subfloor, wall and roof sheathing, and stair treads in lieu of plywood.

B. Install particleboard in accordance with appropriate National Particleboard Association installation recommendations.

C. Seal edges of particleboard at damp and humid areas.

3.8 VAPOR RETARDER

A. Attach vapor retarder to wood framing with nails or staples. Adhesive apply to other surfaces.

B. Seal joints in vapor retarder by lapping and bonding with adhesive.

C. Seal nails or staples with vapor retarder tape.

3.9 FACTORY WOOD TREATMENT

A. Shop pressure treat and deliver to site ready for installation, wood materials requiring UL fire rating or pressure impregnated preservatives.

B. Provide UL approved identification on fire resistant treated materials.

1. Deliver fire retardant treated materials cut to required sizes so as to eliminate necessity of field cutting.

C. Ensure exposed materials requiring stain or paint finish do not exceed 15 percent moisture content before applying wood preservative treatment.

3.10 SITE TREATMENT OF WOOD MATERIALS

A. Apply preservative treatment in accordance with manufacturer's printed instructions.

B. Brush apply 2 coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings. Treat site-sawn cuts.

C. Allow preservative to dry prior to erecting members.

D. Ensure exposed materials requiring stain or paint finish do not exceed 15 percent moisture content before applying wood preservative treatment.

END OF SECTION

SECTION 062010
SITE CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Provide all labor, equipment and materials for the installation of site carpentry, including but not limited to fences, benches, and decks as shown on the drawings and specified.

1.2 REFERENCES AND STANDARDS

A. American Society for Testing and Materials (ASTM):
   1. ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. ASTM A307 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
   3. ASTM D1761 Standard Test Methods for Mechanical Fasteners in Wood.
   4. ASTM D1037 Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.

B. Federal Specifications (FS):
   1. FS FF-S-111D Screws, Wood.
   2. FF-S-325 Expansion Shields.

C. American National Standards Institute (ANSI):
   1. ANSI B18.2.1 Square and Hex Bolts and Screws, Inch Series.

D. International Code Council (ICC):
   1. ICC Report ESR 1190, Trex Wood-Polymer Composite Lumber.
   2. California Building Code (CBC)

1.3 QUALITY ASSURANCE

A. Redwood: "Standard Specifications for Grades of California Redwood Lumber" graded under the rules of the Redwood Inspection Service.

B. Lumber: Grade stamp to contain symbol of grading agency, mill number of name, grade of lumber, species of species grouping or combination designation, rules under which grades, where applicable, and condition of seasoning at time of manufacture.
   1. Softwood Plywood: Appropriate grade trademark of the American Plywood Association.Type, grade, class and Identification Index.
   2. Inspection and testing agency mark.

C. Pressure Treatment of Wood: In accordance with the American Wood Preservers Institute (AWPI) Standards.

D. Poles and Posts: Shall conform to American National Standards Institute specifications and dimensions for wood poles 05.1-1972, and poles shall be selected for uniformity and appearance with maximum taper of 1-inch per 10 linear feet.

E. Preservative-treated Lumber: Lumber shall be pressure-treated for "Below Grade Use" in conformance with AWPA Standard C-2.

F. Abbreviations: AD - air dried. KD - kiln dried. VG - vertical grain. FG - flat grain. RWD - redwood. DF - Douglas Fir. PT - pressure-treated. All wood surfaced, four sides, unless otherwise designated "rough".

1.4 PROTECTION

A. Lumber shall be stored in neat stacks at the site unless it is to be used immediately. All lumber shall be piled so that it may be readily inspected and shall be handled in a manner that will avoid injury or breakage.

B. Immediately upon delivery to jobsite, place materials in area protected from weather.

C. Take special care when handling.

D. Store lumber on a flat surface with skids above ground as necessary to prevent warping.

E. When stacking palleted units, start supports at each end and spaced 24" o. c.

F. Line up supports vertically.

1.5 SUBMITTALS

A. Submit Wood Composite Lumber manufacturer's product data and installation instructions including details of anchors, hardware and fasteners.

B. Certifications
   1. Pressure-treated wood: Submit certification by treating plant stating chemicals and process used, net amounts of slats retained, and conformance with applicable standards.
   2. Submit manufacturer's certificate decking products meet or exceed specified requirements.

PART 2 - MATERIALS

2.1 LUMBER

A. Except where otherwise noted, all lumber shall conform to the allowable characteristics permitted within the applicable grading rule. No splits, checks, holes, decay or other irregularities will be permitted except characteristic of that grade.

B. Lumber shall be as follows:
   1. Unless otherwise indicated on drawings or specified, lumber shall be Construction Heart B Redwood or approved equal.
   2. Bench and fascias shall be Redwood, Clear Heart or approved equal.
   3. Posts shall be Construction heart grade or approved equal, and sized as indicated on the Drawings. Treat all posts for "below ground use" (.60 lbs. per cubic foot) in conformance with AWPA requirements.

2.2 PRESERVATIVE TREATED LUMBER CONNECTOR SCREWS

A. Self-taping galvanized flat head deck screws

2.3 ACCESSORIES

A. All hardware used to fasten onto Preservative-treated Lumber shall be galvanized steel.

B. Hardware: Provide all necessary nails, screws, clips and bolts required for proper installation of wood and wood composite lumber decking. Sizes and quantities as required by code authority having jurisdiction, unless more stringent requirements specified elsewhere.
   1. Bolts, Exterior Use:
      a. Material Standard: Comply with ASTM A307, with standard washers.
      b. Finish: Galvanized, ASTM A123.
      c. Size: As shown.
   2. Lag Screws:
      a. Material Standard: Comply with ANSI B18.2.1.
      b. Finish: Hot dipped galvanized for exterior use.
   3. Expansion Shields:
      a. Material Standard: Comply with Fed Spec. FF-S-325, Type 1, Group III, Self-drilling.
   4. Nails, General:

a. Material Standard: Comply with ASTM F1667.
b. Type: Common unless otherwise indicated.
c. Finish: Hot dipped galvanized for exterior use.

5. Square-Head-Drive Self-Taping Screws for attaching wood composite decking.
   a. Trimscrews or equal.

2.4 PRESERVATIVE

A. Preservative-treated Lumber shall be pressure-treated for "Below Grade Use" with ACQ, 0.60 retention, in conformance with AWPA Standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:
   1. Verify that site conditions are acceptable for installation of materials.
   2. Do not proceed with installation of wood and wood composite lumber until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Workmanship shall be first class throughout. All lumber (except Wood Composite Lumber) shall be accurately cut and framed to a close fit and shall have even bearing over the entire contact surface. All joints shall be square and tight unless otherwise shown. No shimming will be permitted in making joints. Work shall be free of hammer marks, dents or other disfiguration. Nails and other hardware to be sized per U.C.B. Nailing Schedule and to be seated flush unless otherwise shown. Counter-sink finishing nails 1/16 inch. Holes for bolts shall be bored with a bit 1/16 inch larger than the bolt. Holes for lag screws shall be bored with a bit not larger than the base of the thread (75% of the diameter).

B. Lumber Selection: Select individual pieces so that knots and obvious minor defects will not interfere with connections.

C. Install members with crown and tight knots up.

D. Cut joists, rafters and beams as required to provide a full even and horizontal seating on the support, unless otherwise shown, do not overcut.

E. Do not use lumber with end splits greater than the following:
   1. Joists 2x: Split length greater than 1/2 the wide face of the member.
   2. Beams and headers: Split length greater than thickness of member.
   3. Structural blocking: Split length greater than thickness of member.

F. Limit notches and bored holes in joist and beams as follows:
   1. Not permitted unless detailed on the Drawings or approved by the Structural Engineer.
   2. Notches in bottom o in top at cantilever or continuous span not permitted.
   3. Notches in top shall not exceed 1/6th the depth and shall not be located in the middle 1/3 of span.
   4. Bored holes shall not exceed 1-1/2" nor 1/5 of the depth in diameter, and shall not be within 2" of top or bottom.

G. Fastening:
   1. Use such fastenings and connections as required to connect members securely together or to structure.
   2. Minimum nailing, not otherwise shown or noted, shall convorm to CBC Table 2304.9.1.
   3. Penetration of nails or spikes into piece receiving point shall be not less than ½ length of nail or spike, except, that 16 penny nails may be used to connect pieces of 2" thickness.
   4. Drive nails and spikes no closer together than 2/3 their depth nor closer to edge of member than ¼ their depth.
   5. Place nails, bolts and other connector without splitting wood.

6. Predrill holes whenever nailing tends to split wood. Replace all split members.
7. All nuts and screws shall be tightened when placed and retightened at completion of the job or immediately prior to closing in.
8. Nuts shall be secured against loosening.

3.3 **PRESERVATIVES:**

A. Apply specified preservative to all wood in contact with. Moisture content of wood at time of application shall not exceed 25%. When any framing, cutting or boring of treated wood (field cuts) is performed after treatment, swab all cuts, dips and holes thoroughly with heavy application of the same preservative specified for the treatment of the lumber. Install cut end above grade only.

B. Bolts 5/8" and less in diameter shall be fitted with cut washers, and all bolts and lag screws over 5/8" in diameter shall be fitted with cast or malleable iron washers unless otherwise shown on the Drawings. Select bolt length to fit situation. Where bolts project beyond nut, cut off to a point 1/8" from nut and paint same day with heavy coat of Zinc Chromate primer paint and one coat of Aluminum finish paint (to match the galvanized bolt finish, unless otherwise noted).Bolts to be hot dip galvanized.

C. Stainless steel hardware with stainless steel screws and bolts may be used in lieu of hot dip galvanized. Do not mix stainless steel with galvanized steel hardware.

D. Exposed nails in exterior work shall be hot-dipped galvanized except where specified otherwise.

3.4 **PROTECTION**

A. Protect installed work from damage due to subsequent construction or other activity on the site.

END OF SECTION

SECTION 064000
ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

Section Includes: Architectural woodwork, wood, laminate, solid surface, custom fabricated items, countertops, hardware and accessories, requirements for fabrication and installation.

A. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 081400 - Wood Doors.
   3. Section 099000 - Painting: Field-finishing of woodwork.
   4. Division 22 - Plumbing and Division 26 - Electrical sections for coordination with cabinetwork.

1.2 COORDINATION

A. Coordinate work directly with Work of other Sections as necessary to ensure proper fitting, joining or required clearances of other work.
   1. Exchange and coordinate shop drawings and templates.
   2. Coordinate fabrication schedule.
   3. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

B. Wood Selection Conference: Prior to Pre-Fabrication Conference, conduct conference at veneer supplier's site at which veneer flitches are made available to Architect to select actual flitches to be used on Project for the purpose of establishing acceptable range of aesthetic qualities, identifying flitches of consistent appearance and designating groups of flitches for specific applications and locations on Project.
   1. Attendees: Veneer supplier, woodwork Fabricator and Installer, wood door Manufacturer, Contractor, Construction Manager and Architect.

1.3 ACTION SUBMITTALS

A. Submit in accordance with Section 010000 - Submittal Procedures.

B. Product Data: For each material, system, fabricated item, accessory and finishes.

C. Shop Drawings: Indicate dimensions, descriptions of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, including specific requirements where indicated.
   1. Indicate materials, wood species, component profiles, fastening, jointing, details, finishes and accessories.
   2. For matched wood veneers, show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
   3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   4. Indicate special requirements for field assembly and installation, including field connection locations, required clearances and tolerances.
   5. Indicate provisions for attachment of architectural woodwork and other components performed by others in the field.
   6. Indicate locations of plumbing and electrical service field conditions.

D. Samples: Material and finishes.
   1. (SG-1) Stain Grade Wood with Clear Finish: Submit three units exhibiting expected range of variations in color, pattern, texture, or other characteristics inherent in material and finish.
      a. Solid Wood: 3 inch wide by 12 inch long. Apply finish to all faces and edges.
      b. Veneer: 12 inch length [full length] selected from actual flitches.

2. (PNLG-1) Veneered Paneling with Clear Finish: 48 inches by 48 inches, with veneers representative of and selected from actual flitches. Include at least one face-veneer seam.
3. (SS-1) Solid Surfacing: Solid Surface Fabrication Samples: Submit samples demonstrating chemical welding of two pieces at abutted condition and a separate sample for corner condition. 12 by 12 inch with one edge treatment or profile as specified.
4. Accessories and Hardware: Submit samples of hardware, accessories, and components of wood fabrications and casework.
5. Cabinetwork Unit Samples: Units may be used as part of work if approved.
   a. Base cabinet with door, drawer, countertop and hardware.
   b. Wall-hung upper cabinet with door and shelf.

E. Site Conditions Reports: Relative humidity and temperature readings taken before, during and after installation. Include readings taken in areas where woodwork is stored on site prior to installation.

1.4 INFORMATION SUBMITTALS

A. Qualification Data: For Fabricator and Installer.

B. Product Certificates: For each type of product.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Fabricator and Installer Qualifications:
   1. Fabricator Qualifications: A well-established and experienced fabricator, acceptable to Owner and Architect, employing skilled workers to custom-fabricate millwork, casework and other architectural woodwork similar to that required for this Project, whose Work meets or exceeds quality requirements of specified AWS Grade, and whose completed Work has a record of successful in-service performance.
   2. Installer Qualifications: A well-established installer with experience installing millwork, casework, finish carpentry work, and other custom-fabricated woodwork similar to that required for this Project, whose Work meets or exceeds quality requirements of specified AWS Grade, and whose completed Work has a record of successful in-service performance.
   3. Architect reserves the right to reject woodwork fabricator if it is Architect's opinion that previous performance by fabricator has been unsatisfactory, or if any of the following will not result in required quality within time required for completion:
      a. Shop capacity.
      b. Experience of workers.
      c. Equipment or supply of material.
      d. Previous performance by manufacturer has been unsatisfactory.

B. Welding Qualifications: Qualify procedures and personnel in accordance with American Welding Society's AWS D1 "Structural Welding Code."

C. Mockups: Construct mockups, using same materials to be used for permanent construction, to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution of final Work. Provide the following mockups as described below and as directed by Architect.
   1. General:
      a. See Section 014339 - Mockups for more information.
      b. Submit mockup shop drawings to Architect.
      c. Mockup will serve as Architects review of aesthetic effects and workmanship.
      d. Final selection of materials, system components, configuration, design and other performance and appearance criteria are subject to modification based on review of submittals and mockups.
      e. Obtain Architect's approval of mockups before starting permanent work, fabrication, or permanent construction. Allow 10 days for initial review and each re-review of mockups.
      f. Maintain and protect undisturbed approved mockups throughout construction to serve as a standard for judging completed Work.

g. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 SITE CONDITIONS

A. Delivery, Handling and Storage: Protect woodwork items from damage, dust and dirt. Do not deliver, receive, store or install woodwork materials until storage and installation areas are conditioned in accordance with requirements and recommendations of AWS.

B. Environmental Requirements: Use permanent HVAC system or provide temporary systems and controls to establish and maintain site conditions complying with specified requirements.
   1. Do not deliver, receive, store or install architectural woodwork until building is enclosed, wet work is complete, and temporary or permanent HVAC systems are operating in areas where woodwork is stored and installed and are maintaining temperature and relative humidity at occupancy levels and within the following ranges during the remainder of the construction phase:
      a. Temperature Range: Between 60 and 90 deg F.
      b. Relative Humidity Range: Between 25 and 55 percent.
   2. Fluctuation of Temperature and Relative Humidity Levels:
      a. Do not exceed 15 percent fluctuation over any portion of a 7-day period and not to exceed 25 percent fluctuation over any portion of a 28-day period.
      b. Maintain operation and control of heating, cooling, humidity, ventilation, temporary barriers and similar facilities continuously on a 24-hour basis to avoid rapidly fluctuating ambient levels.
   3. Site Conditions Report: Monitor temperature and relative humidity in areas where woodwork is stored and installed at Project site. Record temperature and relative humidity prior to delivery, throughout storage period and installation, and after installation until time of Substantial Completion. Report recorded values in accordance with Submittals requirements.

C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
   2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 PRODUCTS

2.1 ARCHITECTURAL WOODWORK, GENERAL

A. Quality Standards: Provide custom-fabricated architectural woodwork, casework and fabricated items in accordance Architectural Woodwork Standards, Adopted and Published jointly by Architectural Woodwork Institute, Architectural Woodwork Manufacturer's Association of Canada and Woodwork Institute - Current Edition (AWS) except where more stringent requirements are shown or specified.

2.2 WOOD MATERIALS

A. Provide FSC-Certified wood materials for architectural woodwork, produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
   1. Provide FSC Certified materials for wood materials (WD), painted wood, core materials, plywood, cabinet work and other concealed wood materials.
   2. Submit chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.

B. Provide specified wood materials and other materials recommended by woodwork fabricator, and in compliance with specified AWS Grade.
   1. Wood Moisture Content: 5 to 10 percent.
   2. Provide wood products made with binder containing no urea formaldehyde,
   3. Dimensions: As shown.
   4. Sheathing Thickness: provide specified thickness or AWS thickness required by AWS standards whichever is greater.
   5. Fire-Retardant-Treated Materials: Where fire-retardant-treated materials are indicated, use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.

C. Wood Materials:
   1. Miscellaneous Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
   2. Veneer-Faced Plywood Products: HPVA HP-1, made with adhesive containing no urea formaldehyde.
   3. MDF Board: Medium-Density Fiberboard, ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
      a. Class B or Class A Flame Spread Rating: Vesta FR by Sierra Pine.
      b. Class C Flame Spread Rating: Arreis by Sierra Pine.
   4. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber .
   5. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
   6. Hardboard: AHA A135.4.
   7. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
   8. Softwood Plywood: DOC PS 1, exterior.
   9. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
   10. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
   11. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

2.3 WOODWORK FOR TRANSPARENT FINISH

A. Source Limitations for Wood Materials with Transparent Finish: The intent of this requirement is to ensure matching of wood species and finishes by providing solid wood and wood veneers of like species from a single source with resources to provide materials of consistent quality in appearance and physical properties, and by shop-finishing woodwork in single shop using one process for each finish type.
   1. Engage a qualified woodworking firm to assume undivided responsibility for production of wood-veneer-faced cabinets.
   2. Engage a qualified woodworking firm to assume undivided responsibility for finishing all woodwork.

B. Minimum Quality Standard: Comply with *Architectural Woodwork Standards* (AWS) Premium Grade for architectural woodwork with transparent finish.

C. (SG-1) Hardwood Type for Transparent Finish:
   1. Basis of Design: Provide wood veneers from flitches supplied as selected at Veneer and Solid Wood Selection Conference.
   2. Supply solid hardwood matching veneers.
   3. Species: Birch, Forest Service Certified (FSC) .
   4. Cut:
      a. Veneer: rift-sawn.
      b. Solid: rift-cut.

D. Transparent Finish: Shop-applied, AWS Premium Grade, System 5 Conversion Varnish.
   1. Pre-finish woodwork at shop, defer only final touchup, cleaning, and polishing until after installation.
   2. Finish all surfaces, faces and edges of architectural woodwork.

a. Backpriming: Apply two coats of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork.

3. Sheen: Matching Architect's sample.

E. Veneer Matching: Provide hardwood veneers as specified below, and matching solid hardwood.

1. Wood Door Veneers: Doors that appear within areas of paneling will be made as part of sequence. If more than one flitch is used, similar flitches will be selected and break shall be made at inconspicuous point such as corner, door or window.
   a. Match between Veneer Leaves: Book match.
   b. Assembly of Veneer Leaves on Door Faces: Center-balance match.
   c. Pair and Set Match: Provide for doors hung in same opening.
   d. Exposed Vertical Edges: Same species as faces or a compatible species - edge Type A.
2. Joints shall be tightly spliced to avoid visible open joints. Open joints will be rejected.

F. Wood Veneer-Faced Cabinets with Transparent Finish: Prefinished flush overlay style cabinets, AWS Custom Grade, unless otherwise indicated.

1. Cabinetwork Veneers: (PNLG-1) as specified above. Comply with veneer matching requirements.
   a. Veneer Matching within Panel Face: Balance match.
   b. Grain Direction for Cabinetwork: Vertically for drawer fronts, doors, and fixed panels.
2. Semi-Exposed and Non-Exposed Wood Components (indicated as (SG -1) on Drawings): Where indicated in casework details, provide semi-exposed interior cabinet finishes fabricated with hardwood veneers. Refer to Drawings for specific components and locations.
3. Semi-Exposed and Non-Exposed Components:
   a. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
      1) Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
   b. Drawer Subfronts, Backs, and Sides: Thermoset decorative panels with PVC or polyester edge banding.
   c. Drawer Bottoms: Thermoset decorative panels.
   d. Cabinet Liner: Medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1 or .020 inch cabinet liner, 45 lb. density particleboard. Color: White.
   e. Drawer Interiors: Melamine laminate, thermoset decorative overlay conforming to requirements of ALA 1988. Color: White.
   f. Cabinet Interior Shelves: Provide melamine at semi-exposed interior shelving in cabinetwork. Color: White.
4. Non-Exposed Surfaces (components that are not indicated on Drawings):
   a. Cabinet Liner: Medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1 or .020 inch cabinet liner, 45 lb. density particleboard. Color: White.
   b. Drawer Interiors: Melamine laminate, thermoset decorative overlay conforming to requirements of ALA 1988. Color: White.
   c. Cabinet Interior Shelves: Provide melamine at semi-exposed interior shelving in cabinetwork. Color: White.

2.4 COUNTERTOPS

A. Minimum Quality Standard: Comply with the *Architectural Woodwork Standards* (AWS) Premium Grade for architectural countertops on base cabinets, wall-mounted countertops and shelves.

B. (SS-1) Countertops: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.

1. Product, Manufacturer, Colors and Patterns: Silestone.
2. Configurations as shown on Drawings.
3. Countertop Fabrication:
   a. Fabricate tops in one piece with shop-applied edges unless otherwise indicated.
   b. Inside Corners: Fabricate countertops with square inside corners.
   c. Comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.5 CABINET HARDWARE AND ACCESSORIES

A. Hinges: BHMA A 156.9. Provide 3 per leaf over 48 inches high, 2 per leaf elsewhere. .
   1. Grass Nexis, concealed, all-metal hinges, 110 degree opening (unless otherwise noted) self-closing, 3-way adjustable.
      a. Quiet Soft-Cushion Closers: Nexis G-Force Soft Closer.

B. Door and Drawer Pulls: BHMA A156.9, B02011, rectangular frame pull, back-mounted type.
   1. Mockett; DP137; matte chrome.

C. Catches: Push-in magnetic catches, BHMA A156.9, B03131.
   1. Magnetic Pressure Catches: Häfele 245.80.320, prefinished steel, black.
   2. Metal Strike: Häfele 245.63.988,

D. Drawer Slides: BHMA A156.9, cold rolled steel, zinc plated with positive stop and full extension. Rolling steel balls, nylon rollers meeting or exceeding the following requirements, unless otherwise indicated:
   1. Minimum 75 lb. load rating, for use at drawers 16-inches wide or less.
   2. Minimum 100 lb. load rating, for use at drawers 24-inches wide or less.
   3. Minimum 150 lb. load rating, for use at drawers greater than 24-inches wide, at deep drawers, and drawers with file folder racks.
   4. Full Extension Drawer Slides: Side-mount, ball bearing type; epoxy coated; color to match cabinet interior.
      a. Accuride EW3832.
      b. Blum 430EW.
      c. Hettich W5632.
      d. Blum#430 with positive in-stop. Nylon ball bearing rollers.

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

F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
   1. Shelf Supports: Knape & Vogt 346 NP.

G. Door and Drawer Locks: BHMA A156.11; E07121 door locks and E07041 drawer locks.
   1. Cylinder Lock: Disc tumbler, master-keyed, dull chrome finish by CCL Security Products #0737 and #0738.
      a. Review final keying sequences with Owner.
      b. Provide at hinged doors and drawers, where indicated.
      c. Other Acceptable Manufacturers: Timberline, National, Häfele, CompX National.

H. Cable Passage Grommets: Provide cord grommets in diameter shown, and in color as selected by Architect.
   1. Plastic Grommet Liner and Cap: SG Series or EDP Series by Doug Mockett.
   2. Aluminum Grommet, No Cap: MG Series by Doug Mockett.
   3. Wood Grommet Cap, No Liner: WG Series by Doug Mockett, matching (WD-__).
   4. Aluminum Grommet in Solid Surface: MM Series by Doug Mockett, MM-4 satin chrome.
   5. Type: TG Series by Doug Mockett; [**White 95 / Black 90**].

2.6 AUXILIARY MATERIALS AND COMPONENTS

A. Installation Accessories: Provide assembly hardware as shown on Drawings, or as recommended by Fabricator and approved by Architect.
   1. Mechanical Fasteners and Anchors: Use material, type, size and finish required for each substrate for secure anchorage and as recommended by architectural woodwork fabricator and installer.
      a. Provide concealed anchors unless otherwise indicated.
      b. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
      c. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls.

2. Adhesives: Do not use adhesives that contain urea formaldehyde. VOC Limits for Installation Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Special-Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, rubber, or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
   b. Wood Glues: 30 g/L..
   c. Multipurpose Construction Adhesives: 70 g/L.
   d. Contact Adhesive: 80 g/L.

2.7 FABRICATION

A. General: Fabricate Work of this Section using materials, methods and quality control procedures recommended by AWS, and in accordance with reviewed Shop Drawings.
   1. Complete fabrication in shop, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site.
   2. Join and assemble work to provide durable, strong, rigid units that will not warp or rack, including during shipping and installation.
   3. Disassemble components only as necessary for shipment and installation. Allow for easy handling and passage through building openings.
   4. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
   5. Woodwork in Spaces without Humidification Control: Fabricate Work as necessary to protect installed Work from moisture and damage due to movement and dimensional changes associated with fluctuating temperature and relative humidity levels during construction and after Substantial Completion.

B. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

C. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

D. Metal Framing and Supports:
   1. Welded Connections: Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.
   2. Non-Welded Connections: Fabricate for interconnection of members by means of mechanical fasteners and fittings unless otherwise indicated.

E. Shop Finishing: Pre-finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
   1. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural wood cabinets, as applicable to each unit of work.
   2. Backpriming: Apply two coats of sealer or primer, compatible with finish coats, to concealed surfaces. Concealed surfaces of plastic-laminate-clad paneling do not require backpriming when surfaced with plastic laminate.
   3. Primer Application on Steel Framing: Apply shop primer to prepared surfaces of items unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 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.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examination and Acceptance of Conditions: Before proceeding with installation, take field measurements, examine substrates and verify temperature and relative humidity and other conditions.
   1. Verify that mechanical and electrical items affecting this section are properly placed, complete, and have been inspected by Architect prior to commencement of installation.
   2. Proceed with installation only after unsatisfactory conditions have been corrected and after building temperature and relative humidity are within specified range. Proceeding with the Work indicates acceptance of surfaces and site conditions.

B. Material Moisture Content and Environmental Requirements: Install products at the time and under conditions that will ensure the best possible results and maintain conditions until Substantial Completion.
   1. Comply with recommendations of Architectural Woodwork Standards.
   2. Conditioning: Before installation, condition wood materials and cabinets in accordance with specified site condition requirements.
      a. Do not install unconditioned woodwork.
      b. Reject materials that are wet, moisture damaged or mold damaged.

C. Substrate: Before proceeding with installation, examine substrate to receive work for compliance with requirements for installation tolerances and other conditions affecting performance. Installer must approve substrate prior to installation.

D. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product.
   1. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.
   2. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   3. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.2 INSTALLATION

A. General: Install architectural woodwork in accordance with Architectural Woodwork Standards (AWS) and in accordance with reviewed shop drawings and manufacturer instructions.
   1. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
   2. Install free from hammer or tool marks, open joints or slivers or other defects detrimental to appearance or performance.
   3. Set plumb, level, square and true to dimensions shown and required. Allow for finishes and proper clearances where necessary. Use concealed shims where required for alignment.
   4. Tolerances: Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining work with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
   5. Scribe and cut to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
   6. Coordinate with materials and systems in or adjacent to woodwork and provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.
   7. Shop-Fabricated Work: Before installing, examine shop-fabricated work for completion. Assemble shop fabricated work and complete fabrication at Project site to the extent that it was not completed in the shop. Backprime unfinished surfaces that are concealed when installed.
   8. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

B. Anchorage: Adequately anchor, fasten and support members to form secure, substantial and accurate work and to hold required dimensions and prevent twist.
   1. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

2. Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work.
3. Provide anchorage type required to allow movement of wood due to changes in relative humidity without permanent damage to the wood and other components.

C. Joints: Fit exposed connections together to form hairline joints. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect as determined by Architect.
1. Provide joints to accommodate expansion of woodwork due to changes in relative humidity.

D. Finish Carpentry, Wall Base, Trim and [**Door / Sidelight / Frames**] :
1. Anchor to blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing.
2. Install with minimum number of joints possible, using full-length pieces to greatest extent possible.
3. Miter corners, countersink nails, drill holes for nails in hardwood.

E. Wood Fabrications: Install woodwork assemblies in accordance with approved shop drawings.

F. Cabinetwork Installation: Install cabinets to comply with same AWS Grade as item was fabricated.
1. Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
2. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork. For shop finished items use filler matching finish of items being installed.
3. Countertops: Anchor securely to base units and other support systems as indicated and in accordance with reviewed shop drawings and manufacturer's instructions.
4. Maintain veneer sequence matching of cabinets with transparent finish.

G. Wall-Mounted Shelving and Work-Surfaces: Install standards, brackets and other supports according to manufacturer's written instructions. Fasten to framing members, wood sheathing, wood blocking or metal backing, or use toggle bolts or hollow wall anchors.

H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.
1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are applied in shop.
2. Refer to Section 099000 - Painting for final finishing of installed architectural woodwork not indicated to be shop finished, and for related brackets and other Work exposed to view.

3.3 INSTALLED WORK

A. Damaged or Non-Compliant Woodwork: Remove and replace materials that are damaged or do not comply with requirements.
1. Damaged woodwork may be repaired or refinished if resulting repair work complies with requirements and shows no evidence of repair or refinishing.
2. Remove and replace woodwork materials that are wet, moisture damaged, or mold damaged.
3. Replace, at no additional cost to Owner, materials that are damaged or that cannot be cleaned to satisfaction of Owner.

B. Adjusting: Adjust movable components of assembly to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range, and without binding or damaging assembly components. Lubricate hardware and moving parts. Adjust joinery for uniform appearance.

C. Cleaning: Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.
1. Clean interior finish carpentry on exposed and semi-exposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.
2. Clean cabinetwork, counters, shelves, hardware, fittings and fixtures.

D. Protection: Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
   1. Comply with specified requirements for temperature and relative humidity.
   2. Protect installed products from damage from weather, moisture, dust, dirt and other causes during construction.

E. Demonstration and Training: Instruct Owner's personnel to operate, adjust and maintain operable components of woodwork assemblies.

END OF SECTION

SECTION 075113
BUILT-UP ASPHALT ROOFING

8/1 **Revised, August 26, 2016**

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Built-up asphalt roofing system.
   a. Roof insulation and cover boards.
   b. Vapor retarder.
   c. Fiberglass felts membrane.
   d. Surfacing: Asphalt and aggregate.
2. Base Bid Roofing System: ~~Built-Up asphalt roofing system to be installed over existing built-up roofing system.~~ 8/1
   a. ~~Alternate Bid Roofing System:~~ Built-up asphalt roofing system to be installed over existing roof sheathing (existing built-up roofing system removed).

B. Related Sections:

1. Section 010000 - General Requirements.
2. Section 024119 – Selective Demolition: Removal of existing roofing materials.
3. Section 061000 – Rough Carpentry: Wood curbs and nailers, fascia boards.
4. Section 076000 - Flashing and Sheet Metal.
5. Section 076100 – Sheet Metal Roofing.
6. Section 079000 - Joint Protection.

1.2 SYSTEM DESCRIPTION

A. Roofing System (BUR-1): 8/1

1. ~~Substrate Board: One layer of substrate board thermal barrier, mechanically fastened to deck.~~
   a. ~~Examine existing roof decks and other substrate surfaces for condition and suitability of surfaces for continued use.~~
2. ~~Vapor Retarder: 2 layers of asphalt-impregnated glass-fiber felt set in and glazed with steep asphalt.~~
3. ~~Insulation: 2 layers of polyisocyanurate foam board roof insulation, each layer set in steep asphalt.~~
   a. ~~Tapered as indicated.~~
   b. ~~Cover Board: overlaid perlite board insulation set in steep asphalt. One layer may be provided at roof drains.~~
   c. ~~Average R-value: R-30 for roof insulation or as indicated by thickness.~~
   d. ~~Provide filler boards at deep insulation.~~
4. Membrane: 4 plies of premium asphalt-impregnated glass-fiber felt set in flat asphalt.
5. Surfacing: Flood coat of flat asphalt, and covering of surfacing aggregate.
   a. Roof system to comply with manufacturer's warranty requirements.

1.3 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 013300, indicating roof size, location and type of penetrations, perimeter and penetration details, roof insulation make-up and layout.

B. Samples: Submit sample of warranty with shop drawings.

C. Deviation to Details: If deviations to indicated details are desired, submit proposed detail changes not later than 10 days prior to bid date.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide primary products, including each type of roofing sheet(felt),bitumen and composition flashings, produced by single manufacturer. Provide secondary products only as recommended by manufacturer of primary products for use with roofing system specified.

B. Approved Applicator: Applicator shall have not less than 5 years of successful experience in installation of similar roofing systems and shall be certified in writing by manufacturer as their licensed or approved applicator, and is eligible to receive manufacturer warranty.

C. Installer's Field Supervision: Maintain full-time installation supervisor/foreman on jobsite during times that roofing work is in progress. Supervisor shall have minimum of 5 years experience in roofing work similar to nature and scope to specified roofing.

D. Preliminary Roofing Conference: As soon as possible after award of built- up roofing work, meet with Installer (Roofer), installers of substrate construction (decks) and other work adjoining roof system including penetrating work and roof-top units, Architect, Owner, Prime Contractor, and representatives of other entities directly concerned with performance of roofing system including (as applicable) Owner's insurers, and test agencies.
   1. Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials and installation facilities and establish preliminary installation schedule. Review requirements for inspections, testing, certifications, forecasted weather conditions, governing regulations, insurance requirements, proposed installation procedures and roofing warranty.
   2. Record discussion including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant. Discuss roofing system protection requirements for construction period extending beyond roofing installation. Discuss possible need for temporary roofing. If meeting ends with substantial disagreements, determine how disagreements will be resolved and set date for reconvened meeting.

E. Pre-application Roofing Conference.
   1. Approximately 2 weeks prior to scheduled commencement of built-up roofing installation and associated work, meet at project site with installer, installers of deck or substrate construction to receive roofing work, installers of roof-top units and other work in and around roofing which has precede or follow roofing work (including mechanical work).
   2. Prime Contractor, Architect, Owner, roofing systems manufacturer's representative, and other representatives directly concerned with performance of work. Record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each participant.
   3. Provide at least 72 hours advance notice to participants prior to convening pre-roofing conference.
   4. Review foreseeable methods and procedures related to roofing work; including but not necessarily limited to following:
      a. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
      b. Review roofing system requirements (drawings, specifications and other contract documents).
      c. Review required submittals, both completed and yet to be completed.
      d. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
      e. Review required inspection, testing, certifying and material usage accounting procedures.
      f. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing.

F. UL Listing: Provide built-up component materials which have been tested for application indicated and are listed by Underwriter's Laboratories, Inc. (UL) for Class A external fire exposure.
   1. Provide roof-covering materials bearing UL Classification Marking on bundle, package, or container indicating that materials have been produced under UL's Classification and follow-up service.

G. FM Listing: Provide built-up roofing system and component materials that have been evaluated by FM System for fire spread, uplift resistance, and hail damage and are listed in "Factory Mutual Approval Guide" for Class I construction.

1. Provide roof covering materials bearing FM approval marking on bundle, package, or container, indicating that material has been subjected to FM's examination and follow-up inspection service.
2. FM I-90 mechanical attachment patterns over metal decking.

~~H. Roof insulation make-up and lay-out shall be approved and accepted by roofing system manufacturer.~~

1.5 PRODUCT HANDLING

A. Store materials off ground and keep under waterproof covering. Do not allow covering to be torn, displaced or damaged. Store rolls by stacking on end, with adequate platform and clearance to prevent penetration of moisture from grade. Handle with care to avoid damage and do not install felts or other materials that have been exposed to moisture. Discard felts that have been exposed to moisture.

B. Cover sides and top of insulation. Do not pile roof materials to such weight as will damage deck or insulation.

C. In cold weather (below 35 degrees F) store felts in warmed enclosure prior to installation and install only heated gravel (plant heat or job heat). Provide sufficient heat to drive moisture from material.

D. Deliver roofing material in manufacturer's protective containers, unopened with labels intact and legible, and comply with manufacturer's instructions for storage and handling.

E. Make no deliveries to project until ready to install or approved storage provided.

F. Store materials on clean, raised platforms with weather protective covering, when stored outdoors. Coverings secured against wind. Factory wraps are not acceptable.

G. Maintain manufacturer's temperature requirements for storage of materials.

H. Provide continuous protection of applied materials against wetting and moisture absorption.

I. Select and operate material handling equipment and store materials as not to damage existing construction, or new roofing system, and without overloading building structural system.

J. Handle and store materials in manner which will not damage material.

K. Heed manufacturer's cautions regarding safe handling, use and storage of materials.

1.6 PROJECT/SITE CONDITIONS

A. Proceed with installation of roofing only after substrate construction has been completed, and after penetrating components have been installed, so that membrane will not be penetrated or damaged by subsequent work.

B. Weather Conditions: Proceed with roofing work only when weather conditions comply with manufacturer's recommendations, and will permit materials to be applied and cured in accordance with those recommendations. Do not exceed temperature limitations recommended by roofing manufacturer.

1.7 WARRANTY

A. Manufacturer's Warranty: Provide 20-year "Roofing Guarantee, No Dollar Limit", covering work of this Section including roofing membrane, composition flashing, roof insulation, vapor retarders, and roofing accessories, signed by roofing system Installer and Contractor and Manufacturer.

B. Special Warranty: Provide a 5 year installer warranty covering work of this Section including defects in workmanship, installation, roofing membrane, flashing, roof insulation, vapor retarders, and roofing accessories, signed by roofing system Installer and Contractor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements provide built-up asphalt roofing systems from one of following manufacturers. Coordinate with removal of existing roofing in Section 024119 – Selective Demolition.

1. GAF Corporation
2. Johns Manville Building Materials.
3. Firestone Building Products.

2.2 VAPOR RETARDER

A. Asphalt Fiberglass Felt: ASTM D2178, Type IV.

B. Cut Back Primer: ASTM D41.

~~**2.3 SUBSTRATE BOARD**~~

~~A. Thermal Barrier: Silicone-Treated Glass Face Gypsum Sheathing (GYP SHTG-4): High-moisture resistant board with silicone-treated gypsum core and fiberglass reinforced faces specially designed for roof substrate.~~

~~1. UL-classified Type DGG when tested in accordance with ASTM E 119~~
~~2. Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84. Noncombustible when tested in accordance with ASTM E 136.~~
~~3. Thickness: 5/8 inch thick.~~
~~4. Size: Manufacturer's standard~~
~~5. Product: Georgia-Pacific DensDeck Prime Fireguard Type X roof board.~~
~~a. Other Acceptable Product: USG Securock roof boards.~~

~~**2.4 COVER BOARD**~~

~~A. Rigid Protection Board:~~

~~1. Composite expanded perlite boards complying with ASTM C728~~
~~2. R-value: 2.78 at 1 inch of thickness complying with ASTM C518.~~
~~a. Provide tapered board where indicated.~~
~~3. Pre-formed cant strip and tapered edges.~~

~~**2.5 INSULATION**~~

~~A. Polyisocyanurate Foam Board: Closed cell polyisocyanurate foam core with laminated black glass reinforced mat facer:~~

~~1. Complying with ASTM C 1289, type II, Class 1, Grade 2.~~
~~2. Density: 2.0 pcf per ASTM D1622~~
~~3. Compressive Strength: 20 psi minimum per ASTM D1621 Procedure A~~
~~4. Meets FM 4450 and UL 1256.~~
~~5. Moisture Vapor Transmission: 1.0 perms maximum per ASTM E 96.~~
~~6. R-Value: ASTM C 1289, and CAN/ULC S770 – Long Term Thermal R-value (LTTR).~~
~~a. 6.0 per 1 inch thickness~~
~~b. 12.1 per 2 inch thickness~~
~~c. 15.3 per 2.5 inch thickness~~
~~7. Thickness: Provide thickness and slope as indicated.~~
~~a. Provide minimum of 2 inches at roof drains and scuppers.~~

2.6 MEMBRANE

A. Provide built-up roof membrane using minimum of 4 plies of fiberglass felts, asphalt moppings, and flood coat of asphalt with gravel surfacing.

B. Manufacturer's System:

1. GAF Corporation

2. Johns Manville Building Materials:
3. Firestone Building Products:

C. Asphalt: Manufacturer shall identify softening point (SP), minimum flashpoint (FP), minimum finished blowing temperature and equiviscous temperature (EVT) for each asphalt shipment.
   1. ASTM D312, Type III; for interply moppings, flood coat, base flashings, insulation, and flood coat at 3 feet drain perimeter.
   2. Asphalt Primer: ASTM D41.

D. Asphalt Fiberglass Felt: ASTM D2178, Type IV or VI as required by manufacturer to meet warranty requirements.

E. Cap Sheet: SBS Rubber Modified Asphaltic Cap Sheet ASTM D5147, Type I.

2.7 ACCESSORIES

A. Flashing Cap Sheet: SBS Rubber Modified Asphaltic Cap Sheet ASTM D5147, Type I.

B. Flashing Cement: As recommended by roofing manufacturer.

C. Flashing:
   1. Asphalt coated, fiberglass flashing sheet as recommended by roofing manufacturer.

D. Gravel: Complying with ASTM D1863, 400 lbs. Slag not allowed.

E. Fasteners
   1. Self-tapping, #12 or #14 fluorocarbon coated or stainless steel screw with drill point, through minimum 3 inch diameter hot dipped galvanized steel plate, "Dekfast" by Construction Fasteners, "Tru-Fast" by Tru-Fast Corporation, "Olympic Roofing Fasteners" by Olympic Fasteners, minimum pull-out strength of 40 lbs. per fastener and acceptable to Factory Mutual for Class I construction. Length shall penetrate minimum 3/4 inch to one maximum through top of flutes.
   2. Base Flashing System: Galvanized 1-1/4 inch barbed galvanized roofing nails through one inch metal discs into wood members and one inch barbed galvanized roofing nails through one inch metal discs into vertical plywood blocking.
   3. Scupper Flanges to Wood Blocking: 1-3/4 inch galvanized roofing nails.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and verify suitability of conditions under which roofing will be applied, with Installer present, compliance with requirements. Report the suitability or unsuitability of substrates to Architect prior to proceeding with roofing installation.

B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.

C. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match thickness' of insulation required.

D. Verify that substrate is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.

E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Perimeter wood blocking, insulation and sheet metal installation shall, as minimum, be in accordance with recommendations of Factory Mutual Loss Prevention Data Sheet 1-49, June 1985.

B. Installation Requirements: Conform to best practice and accomplish by using only skilled mechanics. Exercise special care at openings through roof and at roof edge.
   1. Spill no roofing materials on other building materials. Spilled materials on exposed surface will result in roofer repairing, resurfacing or replacing stained work.

2. Requirements for installation roofing apply to similar operations for vapor retarder and insulation work. No part of roofing system and materials shall be left exposed to inclement weather during application or at end of working day.

C. General Responsibility: Perform no work in conflict with, contrary to, or below standards established by roofing or membrane materials manufacturer. After starting work, roofer is responsible for complete water integrity of membranes, checking work installed on roof and other membranes, and for properly applied membrane. Therefore roofer shall:
   1. Not apply membranes or other work under conditions which are not proper and in best recommended practices, including surfaces or weather.
   2. Examine roof decks and other surfaces with Prime Contractor for suitability of surfaces and do not proceed until corrections have been made where necessary.
   3. Not overheat bitumens and in event of accidental high temperatures, discard entire batch.
   4. Not install any felts or other materials that have been exposed to moisture, store felts off ground and cover with waterproof membrane. Discard felts that have been exposed to moisture.
   5. Review drawings and specification requirements and establish control and test procedures to insure compliance.
   6. Exercise care to insure adequate quantities of materials are used.
   7. Maintain competent foreman continuously supervising work, with authority to discard unsuitable materials or remove unsatisfactory workmen.
   8. Supervise installation of and be responsible for seeing that drains, curbs and other work are properly set and roof is not damaged; make roof and flashing repairs as necessary.
   9. Resolve questionable installation work prior to proceeding.

3.3 PREPARATION

A. Surfaces: Properly prepare surfaces to provide and insure best installation. Decks and other surfaces shall be clean and dry. Sweep and clear areas thoroughly before starting work. Do not start work during threatening weather. Do not proceed over frosty or damp surfaces.

B. Deck Smoothness: Check deck for smoothness and for suitability to receive materials. Install no retarder or insulation over deck with ridges or depressions which exceed 1/4 inch. Have corrections made to provide deck that meets project requirements and roofer's approval.

C. Protection: Cover side of building where materials are hoisted to prevent damage and bitumen spills.

D. Prevent materials from entering and clogging roof drains and conductors, and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

E. Waterstop: Schedule and perform work to provide waterstop at end of daily work.

~~3.4 VAPOR RETARDER~~

~~A. Lay substrate board perpendicular to deck direction with end joints occurring over crests of deck and staggered 2 feet in adjacent rows.~~
   ~~1. Mechanically fasten substrate board directly to deck in accordance with FMG I-90 **[I-60] [I-120]** and Loss Prevention Sheet 1-28 for attachment pattern.~~
   ~~2. Verify presence of conduit below deck prior to fastener installation. Screws shall be installed with manufacturer's recommended screw guns.~~

~~B. Install 2 plies of fiberglass felt in continuous shingle sequence.~~
   ~~1. Install directly to sheathing.~~
   ~~2. Install over substrate board-thermal barrier over metal decking.~~

~~C. Maximum moisture content of felts at time of application shall be one percent of dry weight.~~

~~D. Provide full, uniform mopping of asphalt for vapor retarder construction so that no felt shall touch felt.~~

E. Broom, or press, felts into hot bitumen providing tight, smooth laminations without wrinkles, buckles, kinks or "fishmouths". Air void pockets, as determined by test samples, shall not exceed 5 percent per interply mopping for individual sample and average of all samples shall be less than 3 percent per interply mopping.

F. Carry plies minimum of 8 inch up vertical surfaces.

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3.5 INSULATION

A. Lay first layer of insulation perpendicular to deck direction with end joints occurring over crests of deck and staggered 2 feet in adjacent rows.

B. Use full moppings of asphalt for application to vapor retarder, if vapor retarder is required.

C. Use full moppings of asphalt for application of each subsequent layer of insulation.

D. Maximum moisture content of insulation at time of application shall be 4 percent of dry weight.

E. Place each insulation board while bitumen still tacky.

F. Step-down, or roll-down, insulation layers so that full embedment and flat surface is obtained.

G. Stagger joints of upper layer with joints of bottom layer and stagger short joints in each layer. Stagger joints minimum of 25 percent of board dimension.

H. Lay with edges in moderate contact, but do not force into place.

I. Fill insulation joints wider than 1/4 inch with insulation cut to fit.

J. Install tapered insulation with primed side up or between layers of insulation.

K. Provide tapered edge strip/crickets at locations as indicated.

L. Top surface of insulation shall be smooth and continuous with primed surface exposed to receive new membrane.

M. Provide extra care to properly cut and fit insulation boards to conform to changes in deck slope and other irregularities.

N. Install cover board over insulation by mopping in with asphalt.

3.6 MEMBRANE ROOFING

A. Install 4 plies in continuous shingle sequence after installation of insulation.
   1. Glaze coat of installed 4 plies required if flood coat and gravel surfacing cannot be installed same day. Other phased construction will not be allowed.

B. Maximum moisture content of felts at time of application shall be one percent of dry weight.

C. Provide full, uniform moppings of asphalt for membrane construction so that felt shall not touch felt.

D. Broom, or press, felts into hot bitumen providing tight, smooth laminations without wrinkles, buckles, kinks or "fishmouths". Air void pockets, as determined by test samples, shall not exceed 5 percent per interply mopping for individual sample and average of all samples shall be less than 3 percent per interply mopping.

E. Application of hot asphalt on surface that causes foaming of asphalt shall be cause for rejection of roof area.

F. Carry roofing plies up to top of cant strip and cut off evenly.

G. Install roofing plies in continuous shingle-type sequence such that there are no laps against flow of water.

H. Metal flanges for flashing sleeves shall be primed and set in trowel coat of plastic cement and stripped in with 3 plies of fiberglass felts and hot bitumen moppings.

I. At splash pans, install 2 additional plies of fiberglass felt in full mopping of asphalt.

3.7 COMPOSITION BASE FLASHING SYSTEM

A. Install where roofing system joins vertical or canted surfaces on daily basis.

B. Prime bare masonry surfaces to receive flashing.

C. Install base flashing membrane in full mopping of steep asphalt, with minimum temperature of 400 F. at application, by mopping surface to receive membrane and 2 back-mopping membranes. Fully embed membrane into mopping by rubbing membrane in by hand, so as not to create voids. Do not stretch membrane. End laps shall be 4 inch sealed with plastic cement and reinforcing fabric.

D. Fasten base flashing at top edge with specified fasteners at 8 inch on-center for wood and 12 inch on-center for masonry and seal top edge of base flashing with trowel coat of plastic cement.

E. Install membrane flashing sheets under sheet metal work immediately after base flashing is completed. Minimum 3 inch laps shall be fully cemented with adhesive recommended by manufacturer.

3.8 FLOOD COAT AND AGGREGATE SURFACING

A. Insure that roof surfaces are clean, dry and free of loose gravel.

B. Pour flood coat uniformly over roof surface prior to installation of exposed sheet metal flashings.

C. Apply aggregate uniformly into hot bitumen with complete coverage, 400 lbs. per 100 square feet.

D. Double flood and gravel in 10 feet by 10 feet area at exterior corners and below splash pans, pipe supports and access ladders, and within 3 feet of roof hatches.

3.9 BITUMEN

A. Maximum bitumen temperature in heating equipment.
   1. Bitumen shall not be heated to minimum flashpoint.
   2. Minimum finished blowing temperature for asphalt shall not be exceeded for more than total of 4 hours for any asphalt batch, or portion thereof.
   3. Remove from project bitumen heated above these limits.

B. Temperatures at time and point of application:
   1. Bitumens shall be within 25 degrees F of their equiviscous temperature when applied in roof system.
   2. Bitumens not meeting this criteria shall be reheated or allowed to cool, as required.

C. Rate of Bitumen Application:
   1. Insulation: 30 lbs. per 100 square feet.
   2. Interply moppings for membrane, and over insulation: 27 lbs. per 100 square feet of asphalt, with tolerance of -15 percent and +15 percent.
   3. Flood coat: 60 lbs. per 100 square feet of asphalt.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to condition free from damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 075713
POLYURETHANE FOAM ROOFING

1 New Section, August 26, 2016

PART 1 GENERAL

1.1 SUMMARY

A. This section is an Alternate Bid to Section 075113.

B. Section Includes:
   1. Spray applied polyurethane elastomeric membrane roofing.
   2. Water resistant protective coating.

C. Related Sections:
   1. Section 010000 – General Requirements: Alternates.

1.2 REFERENCES

A. ASTM C 177 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

B. ASTM C 518 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

C. ASTM D 412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension.

D. ASTM D 822 – Standard Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

E. ASTM D 1621 – Standard Test Method for Compressive Properties of Rigid Cellular plastics.

F. ASTM D 1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.

G. ASTM D 1863 – Standard Specification for Mineral Aggregate Used on Built-Up Roofs.

H. ASTM D 2856 – Standard Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer.

I. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

J. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.

K. ASTM E 108 – Standard Test Methods for Fire Tests of Roof Coverings.

L. SPFA Bulletin AX-119 – MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal; Society of the Plastics Industry, Inc., Spray Polyurethane Foam Division.

M. SPFA – Sprayed Polyurethane Foam Surface Visual Guide; Society of the Plastics Industry, Inc., Spray Polyurethane Foam Division.

N. SSPC-SP 6 – Commercial Blast Cleaning (Part of Painting Manual, Volume 2); Steel Structures Painting Council.

1.3 QUALITY ASSURANCE

A. Manufacturer and Applicator Qualifications: Manufacturer of spray applied roofing shall have a minimum of five years experience in manufacture of spray applied roofing.
   1. Roofing applicator shall be licensed by manufacturer and shall have a minimum of five years experience in application of spray applied roofing .

B. Manufacturer Field Representation: Provide qualified representatives of the foam and coating manufacturers to monitor and inspect the installation of their products.

1.4 SUBMITTALS

A. Applicator's Certificate: Submit one copy of licensed applicator certificate issued by manufacturer of membrane materials.

B. Product Data: Manufacturer's data on products to be installed.
   1. Application or installation instructions.
   2. Listing, classification, and approval certifications.
   3. Safety and handling instructions for storage, handling and use of the materials.
   4. Warranty: A specimen copy of the applicable warranty.

C. Product Certification: SPFA accreditation test for Polyurethane Foam materials.

D. Shop Drawings: Show materials and details of fabrication of sheet metal, accessories, or other fabricated items.

E. Qualification Statements:
   1. Manufacturer qualifications.
   2. Installer qualifications.
   3. Independent inspector qualifications.

F. Applicator's Field Quality Control Procedures: Written description of procedures to be utilized to insure proper preparation and installation of sprayed foam and coatings, detail work and follow-up inspection.

G. Maintenance Data: Manufacturers' recommended protection, cleaning, and repair procedures, including recommended frequency of inspection.
   1. Includes proposal for annual inspection program.

H. Guarantees:
   1. Fluid Applied Roofing System: Submit two (2) copies of Standard-Joint Guarantee of the roofing manufacturer, licensed applicator and General Contractor in forms as bound herein.
   2. Insulation Protection Course System: Submit two (2) copies of Dow Chemical Company Standard IRMA Warranty, but waiving the normal warranty for water integrity and waiving responsibility for any incompatibility between membrane and insulation protection course systems.

1.5 PRODUCT HANDLING

A. Deliver materials to job site in sealed, undamaged containers. Containers shall be identified with product name, of manufacture and lot number.

B. Store membrane materials in dry area out of direct sunlight. Storage area temperature shall not exceed 90EF.

1.6 JOB CONDITIONS

A. Proceed with installation of spray applied roofing only after substrate construction has been completed and after penetrating components have been installed, so that membrane will not be penetrated or damaged by subsequent work.

B. Applicator must examine substrate and conditions under which membrane roofing work is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to applicator.

C. Weather Conditions: Proceed with roofing work only when weather conditions comply with manufacturer's recommendations, and will permit materials to be applied and cured in accordance with those recommendations.

1.7 GUARANTEE

A. Completed installation of roofing system shall be guaranteed jointly and severally, on single document, by membrane roofing manufacturer and applicator, against defects of material and workmanship, for a period of five years, beginning with date of completion of roofing.

B. Completed installation of insulation protection course system shall be warranted that it will retain at least 80% of its thermal resistance and that the crushed stone cover will remain in place for a period of ten (10) years commencing with the date of the installation.

C. Submit executed guarantee and warranty at completion of work.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Product and Manufacturer:
   1. Spray-applied Polyurethane Foam Roofing System; Bayseal 2.7 Closed Cell Foam Roofing System; by Covestro AG.
   2. Water Resistive Coating: Bayblock HT/HT Base as manufactured by Covestro AG.
   3. Primer: Bayblock Prime NS as manufactured by Covestro AG.
   4. Alternate acceptable manufacturers only by written submittal and approval by Architect.

2.2 ROOFING SYSTEM MATERIALS

A. Foam: Sprayed-in-place two-component closed-cell polyurethane made by combining an isocyanate (A) component with a polyol (B) component, with the following physical characteristics:
   1. Density in place, when tested in accordance with ASTM D 1622: 2.8 lb/cu ft (43 kg/cum).
   2. Compressive Strength, when tested in accordance with ASTM D 1621: 40 to 60 PSI (2.4 to 4.1 Pa).
   3. Core Density: ASTM D-1622; 2.5 lbs/ft3.
   4. Closed Cell Content, when tested in accordance with ASTM D 2856: 90 percent, minimum.
   5. Thermal Conductivity ("K"), when measured in accordance with ASTM C 177 or C 518: 0.15.
   6. R-Value, ASTM C-518, aged: 6.20 per inch.
   7. Tensile Strength: ASTM D-1623; 90psi.
   8. Flame Spread Index, when tested in accordance with ASTM E 84: Less than 75.
   9. Smoke Developed Index, when tested in accordance with ASTM E 84: Less than 450.

B. Foam for Repair of Existing Foam Roofing: Same type as original foam as-installed.
   1. Other commercial "froth packs" and pour foams are not acceptable.

C. Water Resistive Coating: 100% Acrylic Elastic: Permeability as applied not less than 5.0 perm inch (7.25 ng/Pa s m) when tested in accordance with ASTM E 96, Perm Inch Method.

D. Primer: Single-component, water-based, general purpose primer. Spray, rolled or brush applied.

PART 3 EXECUTION

3.1 INSPECTION OF DECKS

A. Comply with the instructions and recommendations of the roofing system manufacturer.

B. B. Familiarize all installers with correct and safe application and handling procedures:
   1. 1. See SPFA Bulletin AX-119, "MDI-Based Polyurethane foam Systems: Guidelines for Safe Handling and Disposal."
   2. Refer to appropriate Materials Safety Data Sheets (MSDS) for additional safety information.

C. Before starting to apply foam or coating, shut off all HVAC equipment on the roof and seal air intakes and exhausts. Seal other potential sources of air entry into the building.

D. Before work is commenced, surface shall be inspected and treated as necessary to remove latence, loose material on the surface, grease, oil and other contaminants that will affect bond of the membrane.
   1. Surfaces shall be left broom-clean.

E. Commencement of installation implies acceptance of substrate area as suitable to accept the fluid applied roofing.

F. Horizontal surfaces shall be visibly dry and pass a 4 hour rubber mat test (no condensation) p application of coating system.
   1. Tape mat to deck on all edges.

3.2 PREPARATION OF SURFACES

A. Thoroughly clean all surfaces to receive roofing materials in strict accordance with manufacturer's instructions and recommendations.
   1. Remove oil and grease with a commercial grade alkaline cleaner; thoroughly rinse and dry.
   2. Prepare all concrete surfaces by sandblasting or by etching with a 10-15% solution of muriatic acid.
   3. Flush all acid with clean water and allow to dry.

B. Rout or sawcut all cracks exceeding 1/1/6" in width and fill with sealant.

C. Fill all expansion, control and construction joints to be overcoated by roof coating with sealant.

D. Protect adjacent surfaces with drop cloths or masking as required.

3.3 PREPARATION OF DECK

A. Wood Deck
   1. Prime all untreated and unpainted surfaces with an exterior grade primer.
   2. Tape or fill plywood joints more than 1/4 inch (6 mm) wide with a suitable material.
   3. Clean deck of loose dirt, grease, oil, and other contaminants prior to priming or foam application. Remove loose dirt or debris by use of compressed air, vacuum, or brooming. Do not wash with water.
   4. Tongue & Groove Sheathing and Planking: Cover with deck sheathing, fasten to achieve wind uplift requirements specified for roofing system.

3.4 APPLICATION OF FOAM ROOF SYSTEM

A. Do not begin application of foam until all preparation requirements have been completed.

B. Inspect substrate to determine whether sufficient slope exists to eliminate excessive ponding of water. Ponding is defined as an area of 100 square feet (9.2 sq m) or more which holds in excess of 1/2 inch (13mm) of water as measured 24 hours after a rainfall.

C. Do not apply foam during inclement weather or when the temperature or humidity is below that specified by the manufacturer for ambient air and substrate. Use wind barrier if wind conditions could affect the quality of installation.

D. Apply foam in accordance with the manufacturer's specifications and instructions.

E. Build up low areas that could cause ponding by filling in with sprayed foam before the specified thickness of sprayed foam is applied to the entire roof surface.

F. Apply foam with minimum pass thickness of 1/2 inch (13 mm).

G. Apply foam uniformly over the entire surface with a tolerance of plus 1/4 inch per inch (6 mm per 25 mm) of thickness minus 0 inch (0 mm), except where variations are required to insure proper drainage or to complete a feathered edge.

H. Complete the full thickness of foam in any area prior to the end of each day. If due to weather conditions more than 24 hours elapse between foam application and coating application, inspect the foam for UV degradation, oxidation or contamination and, if any of these conditions exist, prepare the surface in accordance with the recommendations of the roofing system manufacturer.

I. Uniformly terminate foam a minimum of 4 inches (100 mm) above the roof line at all penetrations (except drains, parapet walls, or building junctions). Make foamed-in-place cants smooth and uniform to allow positive drainage.

J. Skylights: Terminate foam below weep holes. Do not cover weep holes with foam or coating.

K. Finish the final sprayed foam surface to "smooth," "orange peel," or "verge of popcorn" as defined in the SPFA Sprayed Foam Surface Visual Guide. Remove surfaces classified as "popcorn" and "tree bark" and reapply to an acceptable surface.

L. Allow the foam surface to cure sufficiently.

M. Repair damage and defects to the surface prior to the protective coating application.

N. Keep the foam surface free of moisture, frost, dust, debris, oils, tars, grease or other materials that could interfere with adhesion of the protective coating.

3.5 PROTECTIVE COATING APPLICATION

A. Make sure roof surface is free of any debris.

B. Apply coating over foam at sloped surfaces exceeding 1/2 inch in 12 inches (1:24), vertical surfaces and other surfaces, including exposed roof edges.
   1. Extend coating a minimum of 12 inches (300 mm) onto the flat area of the roof, from penetrations or vertical surfaces.
   2. Apply coating at minimum thickness of 30 dry mils (0.08 mm) total.

C. Inspect the foam surface prior to the application of the protective coating for suitability of base coat application.

D. Do not apply coating during inclement weather. Do not apply when the temperature is below or the humidity is above that specified by the manufacturer for ambient air and substrate. Use wind barriers if wind conditions could affect the quality of installation.

E. Base Coat: Apply the same day as the foam application when possible.
   1. Wait at least two hours after application of the foam before application of the base coat.
   2. If more than 24 hours elapse prior to the application of base coat, inspect the foam for UV degradation. Do not wait more than 48 hours.
   3. Apply the base coat at 1-1/2 gallons per square in a uniform thickness.
   4. Apply base coat so that none of the newly installed foam is exposed.
   5. Allow the coating to cure.
   6. Inspect the pinholes, thinly coated areas, uncured areas or other defects. Repair defects prior to subsequent coats.
   7. Keep the base coat free of dirt, dust, water, and other contaminants until application of the top coat.

F. Top Coat and/or Subsequent Coat
   1. Apply Top Coat at a rate of 1-1/2 gallons per square and subsequent coats in a
   2. timely manner to insure proper adhesion.
   3. Apply additional material in areas of coarse foam profile.

G. Inspect the cured dry film thickness of the finished coating by taking slit samples and examining under magnification. Apply additional coating to areas that are found to have less than the thickness specified.

H. Apply granules in the top coat at the rate recommended by the coating manufacturer.

3.6 TESTING ROOFING

A. Do not flood test any membrane area sooner than 24 hours following completion of application. Flood restricted area to a depth of 2 inches, and maintain at this depth for 48 hours.

B. Repair any leaks that develop and retest.

C. After testing completely drain test section.

END OF SECTION

SECTION 076000
FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Galvanized steel sheet metal flashing, roof edge, coping, expansion and contraction joint covers, parapet wall covers.
2. Prefabricated galvanized steel sheet metal gutters, downspouts, scuppers and gravel guards.
3. Counter flashings for roof mounted mechanical equipment/services.
4. Shop fabricated interior and exterior corners for roof edge flashing, copings, base flashing, and counterflashing, where applicable.
5. Sealant concealed within sheet metal.
6. Shop primer for galvanized sheet metal.

B. Related Sections:

1. Section 010000 – General Requirements.
2. Section 061000 - Rough Carpentry: Wood blocking, nailers, grounds.
3. Section 075113 - Built-Up Asphalt Roofing.
4. Section 079000 - Joint Sealers: Exposed sealants.
5. Section 099000 - Painting: Finish painting.

1.2 REFERENCES

A. "Architectural Sheet Metal Manual" standard industry details by SMACNA.

1.3 PERFORMANCE REQUIREMENTS

A. Install sheet metal and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking and fastener disengagement.

B. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SHOP DRAWINGS

A. Submit shop drawings in accordance with Section 010000.

B. Clearly detail shaping, jointing, length of sections, fastening, and installation details.

1.5 PROJECT/SITE CONDITIONS

A. Exercise care when working on or about roof surfaces to avoid damaging or puncturing membrane or flexible flashings.

B. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Sheet Metal (SMF-3): ASTM A526 or A527, G-90 coating designation with both sides of metal prime painted.

B. Shop Primer: Zinc dust-zinc oxide, FS TT-P-641G, Type 1 or Type 2.

C. Anchorage: Nails and screws of hot dip zinc coated steel. Use screws where exposed anchorage is required. Screws minimum 1-1/2 inch long with neoprene washer under screw head.

D. Solder: Comply with ASTM B32, 50 percent tin and 50 percent lead, used with rosin flux.

E. Concealed Sealant: Tremco curtain wall sealant.

2.2 BUILDING PAPER

A. (BP-2) Building Paper Slip Sheet: Red-rosin type and size building paper, 3 lb/100 sq. ft. minimum weight.

2.3 FABRICATION

A. Factory fabricate metal flashing and sheet metal in accordance with reviewed shop drawings and standard industry details by SMACNA in "Architectural Sheet Metal Manual."

1. Provide interior and exterior corners, where applicable to site conditions.

B. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

C. Wipe and wash clean, soldered joints, to remove traces of flux immediately after soldering.

D. Shop Primer: Clean surfaces of dirt, oil, grease and other residue in accordance with metal producer's recommendations, then apply one coat of primer on both sides of metal before installation.

2.4 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Form gutters and downspouts of profiles and sizes indicated on drawings and as required to properly collect and remove water. Fabricate complete with required connection pieces.

B. Form sections square, true and accurate in size, in maximum possible lengths and free of distortions and defects detrimental to appearance or performance. Hem exposed edges. Allow for expansion at joints.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate and conditions under which flashing and sheet metal work is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sheet metal work in accordance with reviewed shop drawings and Architectural Sheet Metal Manual with sharp clean breaks.

B. Lower edge of flashing, counterflashing and exposed metal edges shall be turned back into hemmed edge.

C. Flashing shall be securely fastened and water and weatherproof. Neatly install with sharp clean breaks. Metal work at roof shall meet roofer's requirements and approval.

D. Butt and locked joint in metal work shall be watertight. Joints shall be lapped in direction of flow.

E. Solder joints shall be screwed or riveted to take stress, with solder acting as sealant between metal.

F. Provide lead wedges where required to hold metal firmly in place.

G. Insulate between dissimilar material with asphalt paint or other approved insulator. No dissimilar metals shall be touching. Work shall be arranged so moisture from one metal does not drain onto dissimilar metal.

H. Install work with proper allowance for expansion and contraction from thermal changes.

I. Prior to starting work, nailers and blocking shall be true to size and line and securely anchored. Do not proceed until corrections are made so straight, level, plumb and properly sized work results.

J. Carefully form flashings, including at masonry, to conform to material dimensions as shown and according to field dimensions as verified.

K. Join lengths of gutters and downspouts with formed seams sealed watertight. Flash and seal gutters to downspouts. Slope gutters to downspout.

3.3 LOCATION OF JOINTS IN METAL

A. Center roof edge cover joints on other building features, symmetrical on facade, with joints not to exceed 10 feet on center, as directed by Architect.

B. Joints in other metal work may be placed where convenient to metal lengths, not to exceed 10 feet lengths.

C. Cut metal for installations to maintain uniform 1/4 inch joint.

3.4 TYPES OF METAL END JOINTS

A. Flush, butt type with backplate for expansion at: Roof edge covers and expansion joint covers.

B. Cover strip over joint, with single lock seam: Typical curb covers.

C. Lapped joints at: Counter flashing, reglets, and similar cover type metal.

3.5 CONSTRUCTION OF END JOINTS

A. Butt Joints With Backplate for Expansion: Provide backplates same gauge and metal as flashing, 6 inch wide (2-7/8 inch each side of joint) conforming to exact shape of back of metal and full profile of metal after forming (except hems).

1. At both ends of each length of flashing metal, provide not less than 3 bent clips riveted near end, to receive backplate. Backplates are to slip under bent clips and shall form tight contact with flashing or cover metal.
2. In installation, butter bed of sealant on backplate and slide section of metal onto backplate, such that backplate fits into clips to hold metal tight and in perfect alignment. Repeat until metal has been set. At joints, install screws with neoprene washers through backplate without fastening to metal flashing length. (Notch out ends of flashing metal to accommodate screw heads and to eliminate obstructions for metal expansion.) Provide screw with neoprene washer at center of each length of roof metal flashing. Provide keepers or cleats to keep metal in place.

B. Locked Cover Strips: Cover strip shall have same profile as flashing and be formed with single lock seam to metal each side of joint. Locked seam joints shall have about 3/4 inch seam lock, with flashing spaced about 3/8 inch and shall permit movement at each joint.

C. Lapped Joints: Lap 3 inches in direction of water flow. At counterflashings, lock bottom edges together.

D. Sealant: Apply concealed sealant in accordance with requirements of Section 079000 - Joint Sealers.

E. At corners, inside or outside type, provide neat corner sections built-up in shop; with soldered joints and follow profile of adjacent metal. No nails permitted at exposed surfaces of exposed roof metal, only screws shall be used. Set roof edges in cooperation with roofer. Form angles to lesser degrees than required to insure snug fit after installation.

3.6 ROOF EDGE

A. At roof edge, install roofing and flashing plies (with plies to lower edge of metal extension as specified under roofing). Form metal to field verified dimension.

B. Install metal straight, in-line, rigidly secured and watertight.

3.7 COUNTERFLASHING AND CURB FLASHING

A. Install metal counterflashing after membrane flashing is installed. Secure with screws through neoprene washers and locate not to exceed 18 inches on center. Lap joints and lock lower edges together.

B. Install counterflashing to provide watertight closure over top of membrane flashing. Corners at curbs shall be soldered watertight. Height of counterflashing above membrane as indicated, with counterflashing carried down 45 degrees cant strip to about 1/2 inch above roof insulation. Bottom edge shall be hemmed (turned back) to eliminate sharp edges.

C. Counter-flash mechanical and electrical items projecting through membrane roofing.

3.8 CLEANING

A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

END OF SECTION

SECTION 076100
SHEET METAL ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal Gutters of material to match existing.
   2. Concealed clips, fasteners, concealed sealant, slip sheet, waterproof membrane, and underlayment.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 061000 - Rough Carpentry: Wood blocking.
   3. Section 075113 – Built-Up Asphalt Roofing.
   4. Section 076000 - Flashing and Sheet Metal.
   5. Section 079000 - Joint Protection.

1.2 REFERENCES

A. AA -Aluminum Construction Manual: Aluminum Sheet Metal Work and Building Construction.

B. NAAMM - Metal Finishes Handbook.

C. SMACNA - Architectural Sheet Metal Manual.

1.3 DESCRIPTION

A. Replacement of deteriorated existing metal gutter sections where identified in field inspection.

1.4 PERFORMANCE REQUIREMENTS

A. Wind-Uplift Resistance: Provide sheet metal roofing capable of resisting design negative uplift pressure as indicated. Provide clips, fasteners, and clip spacing of type indicated and with capability to sustain, without failure, load equal to 3 times design negative uplift pressure.

B. Thermal Movements: Provide sheet metal roofing that allows for thermal movements resulting from change in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealant, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as result of sheet metal thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

C. Water Infiltration: Provide sheet metal roofing that does not allow water infiltration to building interior, with metal flashing and connections of sheet metal roofing lapped to allow moisture to run over and off material.

1.5 SUBMITTALS

A. Shop Drawings and Product Data: Submit in accordance with Section 013300. Indicate material profile, jointing pattern, jointing details, fastening methods, installation details, location and type of penetrations and connections and transitions.

B. Submit manufacturer's installation instructions.

C. Samples: Submit in accordance with Section 013300. Provide sample of metal roofing mounted on plywood backing illustrating typical seam, external corner, internal corner, valley, ridge, junction to vertical dissimilar surface; material and finish.

D. Warranty: Submit 2 copies of manufacturer's written warranty.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installation of sheet metal roofing shall conform to accepted industry standards and be accomplished by manufacturer's approved installer, in accordance with Sheet Metal Contractors Association Handbooks and recommendations and to details shown.

B. Preinstallation Meeting: Prior to installation of roofing and associated work, meet at project site with installer, roofing manufacturer, installers of related work, and other entities concerned with roofing performance. Record discussions and agreements and furnish copy to each participant. Provide at least 72 hours advance notice to participants prior to convening pre-roofing conference.

1.7 STORAGE AND HANDLING

A. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.

B. Prevent contact with other materials or metals during storage which may cause discoloration or staining.

C. Deliver materials in manufacturer's protective covering. Comply with manufacturer's recommendations for handling, storage and protection during installation. Store materials off ground under waterproof covering. Do not expose strippable film finish protection to ultraviolet rays of sunlight, remove immediately after installation.

1.8 COORDINATION

A. Coordinate sheet metal roofing with other trades to insure proper installation of sheet metal roofing.

1.9 WARRANTY

A. Special Weathertight Warranty: Provide 5 year manufacturer's written warranty agreeing to repair or replace sheet metal roofing that fails to remain weathertight after completion and final acceptance of the work.

B. Special Finish Warranty: Submit manufacturer's 20 year written warranty covering failure of the factory-applied exterior finish on metal roofing and agreeing to repair finish or replace sheet metal roofing that evidences finish deterioration. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

A. Precoated Galvanized Steel: ASTM A525, G90; 24 gauge core steel, shop precoated with Kynar fluoropolymer coating. Provide to match existing.

B. Aluminum Sheet: ASTM B209, 6063 alloy, tempered to strength required; plain finish or match existing.

2.2 ACCESSORY MATERIALS

A. Fasteners: Galvanized steel (Aluminum) (Stainless steel) threaded fasteners with soft neoprene washers. Provide concealed clip system. Screws minimum 1-1/2 inch long. Exposed surfaces with finish to match color of sheet metal roofing.

B. Felt Underlayment: ASTM D266; No. 15, asphalt saturated roofing felt.
   1. Waferboard Underlayment: ANSI A208.1; APA Certified 3/8 inch thick.

C. Protective Backing Paint: Zinc chromate alkyd or Bituminous.

D. Solder: FS QQ-S-571.

E. Flux: FS O-F-506.

F. Sealant: As specified in Section 079000 - Joint Protection.
   1. Concealed Sealant: Tremco Curtainwall sealant.

G. Bedding Compound: Rubber asphalt type.

H. Plastic Cement: Asphaltic cement.

I. Waterproof Membrane (Eave Protection Sheet): Cold-applied self-adhering membrane of rubberized asphalt integrally bonded to polyethylene sheeting, Ice and Water Shield by Grace Construction Product.
   1. Other Acceptable Manufacturers:
      a. Polyken Technologies Polyken 640 Ice-O-Late.
      b. Carlisle Coatings & Waterproofings Dri-Start "A".

J. Plastic Flashing: 30-mil thick vinyl flashing by B.F. Goodrich, Wasco, Nervastral, Saraloy, Lexsuco, or Sandell.

K. Thermal Barrier: 5/8 inch Type X core gypsum board.

2.3 FABRICATION

A. Existing metal gutter system, replacement and match of deteriorated sections.

B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.

C. Form pieces in longest practical lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Back paint concealed metal surfaces with protective backing paint.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate and conditions under which gutter replacement is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSPECTION

A. Inspect roof deck and wood facias to verify components are solid, not deteriorated, clean and smooth, free of depressions, waves, or projections, properly sloped to drains, valley, or eaves.

B. Verify surrounding deck and other roof edge components are dry. Joints in wood deck shall be solidly supported and nailed. Joints in underlayment shall be solidly supported and nailed.

3.3 INSTALLATION

A. Execute metal work in accordance with sheet roofing standards, recommendations and manufacturer's instructions.

B. Back paint surfaces in contact with dissimilar materials. Moisture from one metal shall not drain onto another metal.

C. Install work with proper allowance for expansion and contraction from thermal changes.

D. Apply concealed sealant in accordance with requirements of Section 079000 - Joint Sealers.

E. Lower edges of flashing, counterflashing and exposed metal edges shall be turned back into hemmed edge, 1/2 inch high.

F. Construction of end joints in metal flashing shall comply with Section 076000 –Flashing and Sheet Metal, with backplate for expansion.

3.4 BUILT-IN REPLACEMENT GUTTERS

A. Longitudinal joints not acceptable.

B. Secure gutter lining to substrate with cleats spaced as indicated along edges of gutters.

C. At roof edges extend gutter lining under metal roofing 6 inches minimum and terminate in 3/4 inch folded edge secured by cleats. Hook lower end of roofing into lock strip to form 3/4 inch wide loose-lock seam.

D. Seal watertight joint of gutter to drain or scupper with sealant.

3.5 CLEANING

A. Thoroughly clean metal gutters as recommended by manufacturer to remove loose soil and dirt.

3.6 FIELD TESTING AND INSPECTION

A. Water test waterproof membrane prior to installing metal roof system.

B. Inspect membrane as it is being installed to assurance waterproof integrity of membrane.

END OF SECTION

SECTION 077200
ROOF ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Rooftop equipment supports.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 075113 – Built-Up Asphalt Roofing
   3. Section 076000 - Flashing and Sheet Metal.

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 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. 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.

D. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Standards: Comply with the following:
   1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
   2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

1.5 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.

C. Coordinate with MEP Contractors for size, number, location and loads required for equipment supports.

1.6 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: 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. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 METAL MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.

1. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
2. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
3. 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 (0.013 mm).

B. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.

2.2 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. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.

C. 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.

D. 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.

E. 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.

2.3 EQUIPMENT SUPPORTS

A. Equipment Supports: Internally reinforced metal equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. AES Industries, Inc.
   b. Curbs Plus, Inc.
   c. LM Curbs.
   d. Pate Co.(The).
   e. Roof Products & Systems Corp.
   f. ThyCurb, Inc.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported. Confirm with MEP Contractors.

C. Loads: As indicated on the MEP drawings

D. Material: Zinc-coated (galvanized) steel sheet, 0.052 inch (1.32 mm) thick.

1. Finish: Two-coat fluoropolymer.
2. Color: As selected by Architect from manufacturer's full range] <Insert color>.

E. Construction:

1. Provide manufacturer's standard rigid or semi-rigid insulation to maintain roof insulation integrity.
2. Provide reinforced sides when length is greater than 3 feet.Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
3. Factory-installed continuous wood nailers 5-1/2 inches (140 mm) wide at tops of equipment supports.
4. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
5. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
6. Fabricate equipment supports to minimum height of 12 inches (300 mm) above the roof membrane unless otherwise indicated.
7. Sloping Roofs: Where roof slope exceeds 1/4 inch per foot, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.

2.4 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.

PART 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 equipment supports level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
   2. Anchor equipment supports 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. Flash equipment supports into roofing system for a weather tight installation.

3.3 REPAIR AND CLEANING

A. Touch up factory-primed surfaces with compatible primer ready for field painting according to Division 09 painting Sections.

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 OF SECTION

SECTION 079000
JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior and interior sealants.
2. Foam gasket seals.
3. Compressible seals.

B. Related Sections:

1. Section 010000 – General Requirements.
2. Section 033000 – Cast-in-Place Concrete.
3. Section 076000 - Flashing and Sheet Metal.
4. Section 078400 – Firestopping.
5. Section 081213 - Hollow Metal Frames.
6. Section 088000 - Glazing: Glazing sealant.
7. Section 092900 - Gypsum Board: Acoustical sealant.
8. Section 093000 - Tiling: Sealant in tile work.

1.2 SUBMITTALS

A. Comply with Section 010000, unless otherwise indicated.

B. Product Data: Manufacturer's specifications and technical data including performance, construction and fabrication.

1. Manufacturer's installation instructions for specific substrates on surface preparation and application for each type of sealant specified.
2. Indicate joint dimensions and description of sealant.

C. Color Samples: 2 sets of manufacturer's full color range for each type of sealant specified.

D. Quality Control.

1. Statement of qualification for manufacturers and installers.
2. Statement of compliance for compatibility of sealant with adjacent materials and coatings.
3. Field Quality Control submittals as specified in Part 3 of this Section.
   a. Field adhesion tests.
   b. Manufacturer's Field Services: For sizing of foam gasket seals and compressible seals.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with record of successful in-service performance.

B. Provide materials for exterior envelope from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi component materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.5 PROJECT CONDITIONS

A. Weather Conditions: Do not proceed with installation of sealant under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

1. Proceed with work only when forecasted weather conditions are favorable for proper cure development of high early bond strength.
2. Wherever joint width is affected by ambient temperature variation, apply elastomeric sealant only when temperatures are in lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures.

B. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Compatibility and Adhesion Testing: Ascertain sealant compatibility and adhesion with adjacent materials using laboratory testing procedures.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

A. 1-Part Polyurethane Sealants: Polyurethane based one part elastomeric sealant, complying with FS- TT-S-00230C, Type II Class A, with elongation and compression of not less than 25 percent. ASTM C920, Type S, Class 25, Grade NS.

1. Acceptable Manufacturers and Products:
   a. Sika Chemical Corporation: Sikaflex-1a.
   b. BASF Building Systems: Masterseal NP-1.
   c. Tremco Incorporated: Dymonic.
   d. Pecora Corporation: Dynatrol I.
   e. Tremco Incorporated: Vulkem 116.

B. 2-Part Polyurethane Sealant for Horizontal Applications: Self-leveling polyurethane based 2 part elastomeric sealant, complying with FS-TT-S-00227E, Type I, Class A, with shore A hardness of not less than 30 and elongation and compression of not less than 25 percent. ASTM C920, Type M, Class 25, Grade P.

1. Acceptable Manufacturers and Products:
   a. Tremco Incorporated: THC900.
   b. BASF Building Systems: MasterSeal SL-1 or 2.
   c. Pecora Corporation: Urexpan NR-200.

C. Low-Modulus Silicone Rubber Sealant: Silicone rubber based, one part neutral cure elastomeric sealant with plus 50 percent to minus 50 percent movement complying with FS-TT-S-001543, Class A, and recommended by manufacturer for joints.

1. Acceptable Manufacturers and Products:
   a. General Electric: Silpruf SCS 2000.
   b. Dow Corning Corporation: 795 Building Sealant.
   c. BASF Building Systems: Sonolastic Omniseal or OmniPlus.
   d. Pecora Corporation: 864 Silicone.
   e. Tremco Construction Division: Spectrem 1, 2, and 3.

D. Ultra Low-Modulus Silicone Rubber Sealant: Silicone rubber based, one part neutral cure elastomeric sealant with plus 100 percent to minus 50 percent movement complying with FS-TT-S-001543, Class A.

1. Acceptable Manufacturers and Products:
   a. Dow Corning Corporation: 790 Building Sealant.
   b. Precora Corporation: 890 Silicone
   c. Tremco Construction Division: Spectrem 1.

E. Medium-Modulus Silicone Rubber Sealant: Silicone rubber based, specifically designed for weatherproofing stone or other porous materials, one part moisture cure elastomeric sealant with plus 50 percent to minus 50 percent movement and recommended by manufacturer for stone joints.

1. Acceptable Manufacturers and Products:
   a. General Electric: Silpruf SCS 2000.
   b. Dow Corning Corporation: 795 Building Sealant.
   c. Tremco Construction Division: Spectrem 2.

F. Mildew-Resistant Silicone Rubber Sealant: Silicone rubber based, one part mildew resistance sealant with integral fungicide complying with FS-TT-S-001543A, Class A. Specifically recommended by manufacturer for interior joints in wet areas around plumbing fixtures and ceramic tile.

1. Acceptable Manufacturers and Product:
   a. General Electric: Sanitary 1700 Sealant.
   b. Dow Corning Corporation: Silicone 786 mildew resistant.
   c. Tremco Construction Division: Tremsil 600.

G. Acrylic Sealants: General purpose, paintable acrylic-emulsion sealant. Caulk with approximately 12- 1/2 percent elongation complying with ASTM C834.

1. Acceptable Manufacturers and Products:
   a. Tremco Incorporated: Acrylic Latex 834.
   b. BASF Building Systems: Sonolac.
   c. Pecora Corporation: AC-20.

H. Colors: Colors as selected by Architect from manufacturer's standard colors. Acceptance of sealant will depend on range of standard colors available for selection.

2.2 FOAM GASKET SEAL

A. Joint Design: Joint manufacturer shall review layout, configuration, and anticipated movement and establish the specific model number and size of Foam Gasket Sealant for this application.

B. (FGS-1) Foam Gasket Seal: Pre-compressed, 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 pre-compressed 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. Acceptable Manufacturers and Products:
   a. Dayton Superior Specialty Chemicals; Polytite Standard.
   b. EMSEAL Joint Systems, Ltd.; Emseal 25V.
   c. Sandell Manufacturing Co., Inc.; Polyseal.
   d. Schul International, Inc.; Sealtite.
   e. Willseal USA, LLC; Willseal.

C. Splice Adhesive for Foam Gasket Seal: One part urethane wet sealant as recommended by gasket seal manufacturer.

2.3 JOINT SEALANT BACKING

A. Joint Sealant Backer Rod Manufacturers:

1. Denver Foam, Backer Rod Manufacturing, Inc.
2. Sonneborn Sonolastic, BASF Building Systems.
3. Construction Foam Products, Nomaco Inc..

B. 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.

C. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

1. Provide Type C closed-cell backings at horizontal applications and at acoustically-rated assemblies.
2. Use of Type O open-cell backing is acceptable only as approved by Architect for joints meeting the following conditions:

a. Closed-cell backing cannot accommodate joint movement;
b. Joint is not exposed to moisture;
c. Joint is not horizontal;
d. Joint is not in an acoustically-rated assembly.

D. 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.

2.4 ACCESSORIES

A. Joint Primer: Non-staining type recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive type recommended by sealant manufacturer; compatible with joint forming materials.

C. Bond Breaker: ASTM C962, pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine joint surfaces, backing, and anchorage of units forming sealant rabbet, and conditions under which sealant work is to be performed. Do not proceed with sealant work until unsatisfactory conditions have been corrected.

3.2 JOINT SURFACE PREPARATION

A. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant.

B. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5 percent solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant application.

C. Roughen joint surfaces on vitreous coated and similar non-porous materials, wherever sealant manufacturer's data indicates lower bond strength than for porous surfaces. Rub with fine abrasive cloth or steel wool to produce dull sheen.

D. Ensure that joint forming materials are compatible with sealant.

E. Examine joint dimensions and size materials to achieve required width/depth ratios. Use joint filler to achieve required joint depths, to allow sealants to perform properly.

3.3 SEALANT APPLICATION

A. Apply sealant in accordance with manufacturer's printed instructions. Perform work in accordance with ASTM C1193.

B. Prime joint surfaces. Do not allow primer to spill or migrate onto adjoining surfaces.

C. Install sealant backer rod for liquid elastomeric sealant, except where recommended to be omitted by sealant manufacturer for application shown.

D. Install bond breaker tape wherever required by manufacturer's recommendations to ensure that elastomeric sealant will perform properly.

E. Employ only proven installation techniques, which will ensure that sealant will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides.

1. Except as otherwise indicated, fill sealant rabbet to slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between horizontal surface and vertical surface, fill joint to form slight cove, so that joint will not trap moisture and dirt.

F. Install sealant to depth as shown or, if not shown, as recommended by sealant manufacturer but within following general limitations, measured at center (thin) section of bead:
   1. For sidewalks, pavements and similar joints sealed with elastomeric sealant and subject to traffic and other abrasion and indention exposures, fill joints to depth equal to 75 percent of joint width, but not more than 5/8 inch deep nor less than 3/8 inch deep.
   2. For normal moving joints sealed with elastomeric sealant, but not subject to traffic, fill joint to depth equal to 50 percent of joint width, but not more than 1/2 inch deep nor less than 1/4 inch deep.

G. Interior joints not subject to movement, these are:
   1. Gypsum board to masonry joints.
   2. Gypsum board to hollow metal joints.
   3. Gypsum board to concrete joints.

H. Do not allow sealant or compounds to overflow or flow onto adjoining surfaces, or to migrate into voids of adjoining surfaces including rough texture surfaces. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either primer/sealer or sealant.

I. Remove excess and spillage of sealant promptly as work progresses. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes.

J. Rope Wicks: Where wicks for weeping masonry cavity occur in sealant, cut wick flush with sealant face and do not seal wick ends.

3.4 FOAM GASKET SEAL INSTALLATION

A. Comply with manufacturer's recommendations except where more stringent requirements are specified, or except where manufacturer's technical representative directs otherwise.

B. Clean, prepare, and size joints to comply with manufacturer's recommendations. Remove loose materials and other foreign matter which might impair adhesion of sealant.
   1. Size material to obtain compression of 25 percent of uncompressed dimension.

C. Remove foam gasket from protective wrapping.

D. Expose self-adhesive side and secure against joint face.

E. Horizontal Joints: Proceed sequentially in one direction with scarfed ends pushed well past one another.

F. Vertical Joints: Start at bottom and proceed up wall.

G. Do not stretch material during installation.

3.5 FIELD QUALITY CONTROL

A. Sealant Adhesion Field Test: Comply with following.
   1. Weathering Sealant Adhesion: After liquid-applied sealant is fully cured, perform sealant adhesion test according to sealant manufacturer's recommendations.

3.6 PROTECTION AND CLEANING

A. Protect joint sealers during and after curing period from contact with contaminating operations or other causes so that they are without deterioration or damage at time of Substantial Completion.
   1. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

B. Clean off excess sealant or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.7 SCHEDULE

A. Provide sealant where indicated (SLNT) or as required to achieve a weather-tight assembly.

B. The following schedule is not intended to be all inclusive.

1. Exterior Joints at plaster to plaster, and Unit Masonry to Unit Masonry: Ultra low modulus silicone sealant.
2. Exterior Joints at plaster to Window System: Ultra low modulus silicone sealant.
3. Exterior Joints at Stone to Stone: Medium modulus silicone sealant, or as recommended by Stone Supplier.
4. Interior Joints at Unit Masonry to Unit Masonry: Low modulus silicone sealant.
5. Joints subject to Pedestrian or Vehicle Traffic: Use 2 part, self leveling polyurethane sealant.
6. Interior Joints Subject to Movement: One part polyurethane sealant.
7. Interior Joints NOT Subject to Movement: Acrylic sealant.
8. Interior Joints in Ceramic and Quarry Tile Walls and Floors, and around Equipment and Plumbing Fixtures: Mildew resistant silicone rubber sealant.

END OF SECTION

SECTION 081400
WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Prefinished solid core flush wood doors:
      a. Non-rated flush wood doors.
   2. Shop finishing of doors.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 064000 - Architectural Woodwork: Wood veneer and facing.
   3. Section 087100 - Door Hardware.
   4. Section 088000 - Glazing: Glass and glazing for doors.
   5. Section 099000 - Painting: Painted finish.

1.2 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
   1. Indicate hardware locations
   2. Indicate locations of cut-outs for glass and louvers.
   3. Indicate thickness of veneers.
   4. Indicate requirements for veneer matching.
   5. Indicate doors to be factory finished and finish requirements.

C. Samples: Submit samples of wood veneer and factory finishing as follows:
   1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
   2. For each wood species and transparent finish, provide set of 3 samples showing typical range of color and grain to be expected in finished work.

D. Certification: Submit certification that doors and frames comply with NFPA 252 or UL-10.

1.3 QUALITY ASSURANCE

A. Comply with requirements of referenced standard and manufacturer's written instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting
   1. Stack wood doors as recommended by door manufacturer.
   2. Use opaque plastic sheeting for natural finished doors.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings

1.5 PROJECT CONDITIONS

A. Delivery, Handling and Storage: Protect wood doors from damage, dust and dirt. Do not deliver, receive, store or install wood doors until storage and installation areas are conditioned in accordance with requirements and recommendations of AWS.

B. Environmental Requirements:
   1. Do not deliver, receive, store or install architectural woodwork until building is enclosed, wet work is complete, and temporary or permanent HVAC systems are operating in areas where woodwork is stored and installed and are maintaining temperature and relative humidity at occupancy levels and within the following ranges during the remainder of the construction phase:
      a. Temperature Range: Between 60 and 90 deg F.
      b. Relative Humidity Range: Between 25 and 55 percent.
   2. Monitor, Record and Report: Monitor temperature and relative humidity in areas where woodwork is stored and installed at Project site. Record temperature and relative humidity prior to delivery, throughout storage period and installation, and after installation until time of Substantial Completion. Report recorded values in accordance with Submittals requirements.

1.6 WARRANTY

A. Special Warranty: Signed by Manufacturer, Installer, and Contractor, in which Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 PRODUCTS

2.1 WOOD DOORS, GENERAL

A. Quality Standards: Provide wood doors fabricated and installed in accordance with specified Grade classification of the *Architectural Woodwork Standards, Adopted and Published jointly by Architectural Woodwork Institute, Architectural Woodwork Manufacturer's Association of Canada and Woodwork Institute - Current Edition* (AWS)
   1. Comply with AWS Premium Grade, except where more stringent requirements are indicated in the Contract Documents.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

C. Manufacturers:
   1. VT Industries
   2. Eggers Industries
   3. Marshfield Door Systems
   4. Algoma Group

D. WDMA I.S.1-A Performance Grade:[Standard Duty.

E. Structural-Composite-Lumber-Core Doors:
   1. Structural Composite Lumber: WDMA I.S.10.
      a. Screw Withdrawal, Face: 700 lbf.
      b. Screw Withdrawal, Edge: 400 lbf.

F. Construction: Five plies.

G. Adhesives: Type I per WDMA TM-6, waterproof.

2.2 DOOR FACING AND FINISHES

A. Closed-Grain Hardwood Faced Doors with Transparent Finish:
   1. Wood Species and Finish: as specified in Section 064000 - Architectural Woodwork.

B. Shop Finishing: Pre-finish doors at fabrication shop as specified in Section 064000.

2.3 ACCESSORIES

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
   1. Facing and Crossband Adhesive: Type 1 waterproof.
   2. Door Construction: Type 2.

B. Vision Frames:
   1. Non-rated doors: Flush wood frames, hardwood to match facing.
   2. Glass: Refer to Section 088000 for glass types.

2.4 FABRICATION

A. Fabricate wood doors in accordance with requirements of specified AWS Grade.

B. Fabricate Work of this Section using materials, methods and quality control procedures necessary for installed units to withstand dimensional changes that can be expected resulting from temperature and humidity variations at project location when interior spaces do not have humidity control. Seal each surface to help mitigate dimensional change resulting from temperature and humidity variations.

C. Fabricate and label fire-rated doors in accordance with requirements of Underwriters' Laboratories (UL), UL-10C, Category A Positive Pressure, with intumescent required for compliance contained within the door (concealed) and requiring no additional installation of intumescent products.

D. Fabricate doors with hardware blocking as follows:
   1. Provide head and sill rails on all doors.
   2. Provide adequate blocking for doors specified with concealed overhead stops and surface mounted closers.
   3. Provide lock-block at fire-rated, mineral core doors at latch side only.
   4. Provide cross blocking only when exit devices are specified for door.
   5. Provide hook block for pivots, or when floor bolts are specified under Section 087100 - Door Hardware.

E. Provide doors with minimum 1-1/4 inch thick edge strips, of wood species to match face veneers except as required for UL rating.

F. Make cut-outs and provide stops for glass and louvers. Seal cut-outs prior to installation of moldings.
   1. For full light doors: Provide cut out from flush wood door, with vertical grain direction.

G. Bevel strike edge of single acting doors 1/8 inch in 2 inches. Radius strike edge of double-acting swing doors 2-1/8 inches.

H. Prepare doors to receive hardware. Refer to Section 087100 – Door Hardware and NFPA 80 for hardware requirements including UL-10C.
   1. Factory pre-machine doors for all mortised hardware, including pilot holes for hinge screws and lock fronts.
   2. Prefit and bevel to net opening size less approximately 3/16 inch in width and provide 1/4 inch clearance above finished floor, unless otherwise indicated on drawings.
   3. Slightly ease vertical edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with installation, examine openings to receive wood doors and other conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Material Moisture Content and Environmental Requirements: Comply with recommendations of AWS Woodwork Standards.
   a. Do not install woodwork that has not been conditioned to average prevailing humidity conditions in installation areas.
3. Reject doors with defects.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions. Architectural woodwork Installer shall approve substrate prior to installation.

3.2 INSTALLATION

A. Hardware: For installation, refer to Section 087100 - Door Hardware.

B. Installation Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
   2. Install smoke- and draft-control doors according to NFPA 105.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
   1. Clearances: Provide 1/8 inchat heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.
   2. Comply with NFPA 80 for fire-rated doors.
   3. Factory-Finished, Job-Fitted Doors: Restore finish before installation if fitting or machining is required at Project site.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 INSTALLED WORK

A. Damaged or Non-Compliant Work: Remove and replace materials that are damaged or do not comply with requirements.
   1. Damaged finish may be repaired or refinished if resulting repair work complies with requirements and shows no evidence of repair or refinishing.

B. Adjusting: Adjust movable components to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range, and without binding or damaging assembly components.
   1. Lubricate hardware and moving parts in accordance with Manufacturer's written instructions.
   2. Operation: Rehang or replace doors that do not swing or operate freely.

C. Cleaning: Clean and maintain installed work as frequently as necessary through the remainder of the construction period.

D. Protection: Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
   1. At clear finished doors, do not partially cover door surfaces with paper, cardboard, or other opaque covering that will create uneven aging of wood veneer.

E. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 085213
METAL-CLAD WOOD WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Factory assembled aluminum clad wood windows, glass and glazing, operable hardware, weatherstripping.
   2. Anchorages, attachments, and shims.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 061000 - Rough Carpentry.
   3. Section 064000 – Architectural Woodwork: Interior window trim and moldings.
   4. Section 092400 - Portland Cement Plastering.
   5. Section 099000 - Painting.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

A. Standards: Performance requirements for structural performance, air infiltration, and water penetration for wood windows are those specified in NWWDA I.S. 2 "Industry Standard for Wood Window Units."
   1. Provide wood window units bearing NWWDA "Hallmark Program" label certifying compliance with requirements of NWWDA I.S. 2 for performance grade indicated.

B. Testing: Manufacturer's stock units of each grade of required wood window shall have been tested by recognized testing laboratory or agency in accordance with ASTM E283 for air infiltration, ASTM E547 for water penetration, and ASTM E330 for structural performance. Test samples shall comply with requirements in NWWDA I.S. 2 for test sample sizes and methods.

C. Performance Requirements (Grade 40 Windows): Each required window unit shall comply with following performance requirements:
   1. Air Infiltration: Not more than 0.25 cfm per sq. ft. of overall frame area at inward test pressure of 1.57 lbs per sq. ft.
   2. Water Penetration: No water penetration as defined in test method at inward test pressure of 4.43 lbs per sq. ft.
   3. Structural Performance: No glass breakage, damage to hardware, permanent deformation that would impair operation of unit, or residual deflection greater than 0.4 percent of span at positive (inward) and negative (outward) test pressure of 40 lbs per sq. ft.

D. Performance Requirements (Grade 60 Windows): Each required window unit shall comply with following performance requirements:
   1. Air Infiltration: Not more than 0.10 cfm per sq. ft. of overall frame area at inward test pressure of 1.57 lbs per sq. ft.
   2. Water Penetration: No water penetration as defined in test method at inward test pressure of 6.24 lbs per sq. ft.
   3. Structural Performance: No glass breakage, damage to hardware, permanent deformation that would impair operation of unit, or residual deflection greater than 0.4 percent of span at positive (inward) and negative (outward) test pressure of 60 lbs per sq. ft.

1.3 SUBMITTALS

A. Submit manufacturer's complete quality assurance information, product information, data and MSDS information including submittals for manufacturer's other than listed approved.

B. Shop Drawings and Product Data: Submit in accordance with Section 010000. Indicate pertinent dimensioning, general construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.

C. Samples: Submit in accordance with Section 013300. Submit sample of each type of operable hardware indicating style and finish.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firms whose windows have been certified under the NWWDA "Hallmark Program" for wood window units and are listed in current NWWDA "Membership and Product Directory" and comply with requirements indicated.
   1. Provide only wood window units bearing a NWWDA "Hallmark Program" label certifying compliance with requirements of NWWDA I.S. 2.

B. Wood Window Standard: Comply with NWWDA I.S. 2 for standards of performance and fabrication workmanship for wood windows.

C. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated.

D. Insulating Glass Certification Program: Provide insulating glass units permanently marked with appropriate certification label of either Insulating Glass Certification Council (IGCC) or Associated Laboratories, Inc. (ALI). Provide certification label either on spacers or at least one component pane of each unit.

E. Single Source Responsibility: Provide windows produced by single fabricator who is capable of indicating prior successful production of units similar to those required.

1.5 DELIVERY OF MATERIALS

A. Deliver windows in manufacturer's packaging complete with installation instructions.

1.6 WARRANTY

A. Provide warranty for materials and installation for 5 years for discoloration or delamination of aluminum cladding.

B. Provide glass manufacturer's warranty for sealed glass units for 10 years.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. (WDW-1) Metal clad wood windows.

B. Manufacturer and Type: Aluminum Clad single hung, and casement, factory assembled, and related fixed units.

C. Acceptable Manufacturers:
   1. Marvin Windows
   2. Pella Windows.
   3. Eagle Window and Doors – Andersen.
   4. Other manufacturers: Equals as approved by Architect.

2.2 COMPONENTS

A. Frames: Exterior surfaces of aluminum clad clear pine with preservative treatment; mortise and tenon slot mortise joint construction; sills of one piece with wash to exterior.

B. Operable Sash Frames: Of same materials and preservative treatment as frames; glued and steel pinned joint construction; with applied glass stops, size and profile to suit.

C. Glass Stops (Fixed Lights): Size and profile to suit; same material as cladding.

D. Glass: Insulating sealed double glazed units; Northern Low E type. Refer to Section 088000 - Glazing for requirements.

E. Weatherstripping (for Operable Sash): Manufacturer's standard type; resilient vinyl.

F. Mullions for Interior and Exterior: For multiple window units, of unfinished clear pine with preservative treatment for interior and aluminum covered wood frames for exterior, same as frames noted above.

G. Brickmold: Manufacturer's standard aluminum brickmold extrusion, Pella profile X2436 and clip X2093, standard color.

2.3 FABRICATION

A. Fabricate windows to allow for tolerances of framed openings, clearances, and shim spacing around perimeter of assemblies, to enable rapid installation.

B. Fit joints and corners to hairline joints. Match components carefully ensuring continuity of line and design. Make joints and connections weatherproof.

C. Provide for moisture entering joints or condensation occurring within frame construction and glazing spaces to drain to exterior.

2.4 FINISH

A. Exterior Finish: Metal cladding in standard white color as approved by Architect.

B. Interior Finish: Softwood ready for site painting (Section 099000).

2.5 HARDWARE

A. Casement Windows:

1. Operator: Dual steel rotary operator.
2. Lock: Manufacturer's standard lock.
3. Handle Profile: Manual Folding Crank handle.
4. Finish: Color match existing frame extrusion.

B. Single-Hung Windows:

1. Balance: Concealed Block and Tackle System with Sash Lift.
2. Sash Lock: Manufacturer's standard positive action Cam-Lock.
3. Sash Lift Handle: Manufacturer's standard solid metal surface mounted handle.
4. Finish: Color match existing window frame extrusion as approved by Architect.

2.6 ACCESSORIES

A. Flashing: Refer to Section 076000 – Flashing and Sheet Metal.

B. Sealants: Refer to Section 076000 – Sealant.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect openings before beginning installation. Verify that opening is correct and sill plate is level. Do not proceed with installation of window units until unsatisfactory conditions have been corrected.

1. Masonry surfaces shall be visibly dry, and free of excess mortar, sand and other construction debris.
2. Wood frame walls shall be dry, clean, sound and well-nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches of corner.
3. Coordinate window installation with wall flashings and other built-in components.

3.2 INSTALLATION

A. Install windows in accordance with reviewed shop drawings and manufacturer's recommendations, to achieve weathertight and freely operating installation.

B. Maintain alignment with adjacent work. Secure assembly to framed openings without distortion.

C. Place insulation in shim spaces around unit perimeter, to maintain continuity of building the barrier.

D. Leave window units closed and latched.

E. Adjust operating sash and hardware to provide smooth operation with tight weatherproof closure.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation. Take care to avoid damage to protective coatings and finishes. Remove excess glazing and sealants, dirt, and other substances.

END OF SECTION

SECTION 087100
DOOR HARDWARE

1 **Revisions , August 26, 2016**

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
   1. Commercial door hardware for the following:
      a. Swinging doors.
      b. Non-fire-rated sliding doors.
      c. Non-fire-rated folding doors.
      d. Other doors to the extent indicated.
   2. Cylinders for doors and locking devices specified in other Sections.
   3. Electrified door hardware.

B. Related Sections:
   1. Section 081113 – Hollow Metal Doors and Frames.
   2. Section 081400 – Wood Doors.
   3. Section 084113 – Aluminum-Framed Entrances and Storefronts
   4. Section 087113 – Automatic Door Operators.
   5. Division 26: Electrical.

1.2 GENERAL REQUIREMENTS

A. Provide items, articles, materials, operations and methods listed, mentioned or scheduled herein or on drawings, in quantities as required to complete project. Provide hardware that functions properly. Prior to furnishing hardware, advise Architect of items that will not operate properly, are improper for conditions, or will not remain permanently anchored.

B. All hardware shall meet the requirements of CBC Sections 1133B.2.1, 1133N.2.1, 1133B.2.5.1 and 1003.3.1.8. Thresholds shall comply with CBC Section 1133B.2.4.1.

C. Mounting height of latching hardware shall be 30 inches to 44 inches A.F.F. per CBC Section 1133B.2.5.1. Pressure to operate the door shall not exceed: 5 lbs. (38N) for exterior doors, 5.0 lbs. (38N) for interior doors and when fire doors are required 5 lbs (38N) max or the maximum effort to operate the door may be increased to the minimum allowable by the appropriate administrative authority, not to exceed 15 lbs (66.72N). 1133B.2.5.

1.3 SUBMITTALS

A. Hardware Schedule: Submit hardware schedule per Section 013300 in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Schedules, which do not comply, will be returned for correction before review. Hardware schedule shall clearly indicate architect's hardware group and manufacturer of each item proposed. The schedule shall be reviewed prior to submission by a certified Architectural Hardware Consultant, who shall affix his or her seal attesting to the completeness and correctness of the schedule.
   1. Provide illustrations from manufacturers' catalogs and data in brochure form.
   2. Check specified hardware for suitability and adaptability to details and surrounding conditions. Indicate unsuitable or incompatible items and proposed substitutions in the hardware schedule submittal.
   3. When requested, provide listing of manufacturers' template numbers for each item of hardware in the hardware schedule submittal.

4. Furnish associated Contractors and Subcontractors with copies of final approved hardware schedule. Submit necessary templates and schedules as soon as possible to hollow metal, wood, aluminum, and other door & frame fabricators in accordance with schedule they require for fabrication.
5. Samples: Lever design or finish sample: Provide 3 samples, if requested by architect.

B. Closer Mounting: Indicate mounting description for each closer included in the submittal's hardware groups - i.e., push side mount (parallel arm), pull side mount (regular arm), or push side top mount (top jamb).

C. References to "EXISTING HARDWARE" When hardware is assigned/specified for "existing" openings, field verify existing conditions (functions, designs, finishes, swings, etc.) prior to forwarding submittal documents for approval. Advise any existing conditions which would prevent utilization of assigned/specified hardware.

D. Electrified Hardware Coordination:
1. Provide "operational descriptions" for each electrified hardware group in the hardware schedule submittal. Descriptions should include operation of the doors for exit, entry, and/or fire or smoke alarm conditions. Use operational descriptions included in the specified electrified hardware groups as a guide.
2. Wiring Diagrams: When requested after final approval of the hardware schedule submittal, provide complete and detailed system operation and elevation riser and wiring diagrams specially developed for each opening that requires electrified hardware, except openings where only magnetic hold-opens or door position switches are specified. Provide these diagrams with hardware delivery to the jobsite.
3. Coordination Meeting: When requested by Architect and/or Owner, the Contractor shall schedule a meeting prior to the installation of electrified hardware to review and coordinate functions and connections. Participants shall include representatives/suppliers of all applicable electrified hardware components including but not limited to; fire alarm systems, security systems, automatic door operators, electrical systems, etc. Advise Architect/Owner of scheduled date, time, place, and attendees.

E. Installation Instructions: Provide manufacturer's written installation and adjustment instructions for finish hardware. Send installation instructions to site with hardware.

F. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

G. Contract Closeout Submittals: Comply with Section 017800 including specific requirements indicated.
1. Operating and maintenance manuals containing the following:
   a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Name, address, and phone number of local representative for each manufacturer.
   d. Parts list for each product.
2. Copy of final approved hardware schedule, edited to reflect "As installed".
3. Copy of final keying schedule.
4. As installed "Wiring Diagrams" for each opening connected to power, both low voltage and 110 volts.
5. One complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Manufacturer: Obtain each type of hardware (ie. latch and locksets, hinges, closers) from single manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: Recognized architectural finish hardware supplier, with warehousing facilities, who has been providing hardware for period of not less than 3 years. The supplier shall be, or employ, a certified Architectural Hardware Consultant (AHC), who is registered in the continuing education program as administered by the Door and Hardware Institute. The hardware schedule shall be prepared and signed by a certified AHC.

C. Installer: Firm with 3 years experience in installation of similar hardware to that required for this project, including specific requirements indicated.

D. Regulatory Label Requirements: Provide nationally recognized testing agency label or stamp on hardware for labeled openings. Where UL requirements conflict with drawings or specifications, hardware conforming to UL requirements shall be provided. Conflicts and proposed substitutions shall be clearly indicated in hardware schedule.

E. Accessibility Requirements: Doors to stairs (other than exit stairs), loading platforms, boiler rooms, stages and doors serving other hazardous locations shall have knurled or other similar approved marking of door lever handles or cross bars, if required by local building codes.

F. Pre-Installation Conference: Prior to the installation of hardware, manufacturers' representatives for locksets, closers, and exit devices shall arrange and conduct a jobsite meeting to instruct the installing contractor's personnel on the proper installation of their respective products. A letter of compliance, indicating when this meeting is held and who is in attendance, shall be sent to the Architect and Owner.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver hardware to jobsite in manufacturer's original packaging, marked to correspond with the approved hardware schedule. Do not deliver hardware until suitable locked storage space is available. Check hardware against reviewed hardware schedule. Store hardware to protect against loss, theft, or damage.

B. Deliver hardware required to be installed during fabrication of hollow metal, aluminum, wood, or stainless steel doors prepaid to the respective manufacturer.

1.6 WARRANTY

A. Guarantee workmanship and material provided against defective manufacture. Repair or replace defective workmanship and material appearing within period of one year after Substantial Completion.

B. Provide a minimum ten year factory warranty on door closer body against defects in material and workmanship from date of occupancy of Project.

C. Replace shortages and incorrect items with correct material at no additional cost to Owner.

D. At completion of project, qualified factory representative shall inspect closer installations. After this inspection, letter shall be sent to Architect reporting on conditions, verifying that closers have been properly installed and adjusted.

PART 2 PRODUCTS

2.1 GENERAL

A. Confirm acceptable manufacturers and models of all hardware products with Architect and Owner. Specified products are listed to establish function and a level of quality.

2.2 BUTTS AND HINGES

A. Acceptable Manufacturers: Hager product numbers used for design intent. Provide products from
   1. Bommer, Hager, Ives, McKINNEY, PBB, Stanley

B. Types:
   1. Type 1 (BB1262): heavy-weight, swing-clear
   2. Type 2 (BB1279): standard-weight, ball-bearing

3. Type 3 (BB1191): standard-weight, rust-resistant/ non-ferrous (brass, bronze, or stainless-st base metal), ball-bearing
4. Type 4 (BB1168): heavy-weight, ball-bearing
5. Type 5 (BB1199): heavy-weight, rust-resistant/ non-ferrous, ball-bearing

C. Application:

1. Exterior out-swinging doors	Type 5 x NRP
2. Exterior in-swinging doors and vestibule doors	Type 4
3. Interior doors with closers	Type 2 or 4
4. Interior doors over 36 inches wide	Type 4
5. Interior doors 36 inches or less without closer	Type 2

6. Provide NRP (non-removable pins) at out-swinging doors that are lockable or locked and at other doors when specifically indicated.
7. Provide hospital tips when specifically indicated.

D. Size:

1. 2-1/4 inch Doors	5 inch by 5 inch
2. 1-3/4 inch Doors	4-1/2 inch by 4-1/2 inch
3. 1-3/8 inch Doors	3-1/3 inch by 3-1/2 inch

E. Quantity:
1. 2 – hinges per leaf for openings through 60 inches in height.
2. 1 – additional hinge per leaf for each additional 30 inches in height or fraction thereof.
3. 1 – additional hinge per leaf for openings 40 inches wide and wider.
4. 4 – hinges for Dutch doors up to 90 inches in height.

F. Drill 5/32 inch hole and use No. 12, 1-1/4 inch steel threaded to the head wood screws for hinges on wood doors.

G. Listed manufacturers and models indicate current building standards. Equivalent models by other manufacturers will be considered for Owner-approval by alternate bid and/or by written request.

2.3 ELECTRIC HINGES

A. Acceptable manufacturers:
1. Bommer BB5000 Series concealed electric thru-wires
2. Hager ETW
3. McKinney CC
4. PBB EL
5. Stanley CE

B. Provide sufficient number of concealed wires to accommodate electrified function of specified hardware.

C. Electric hinges to be located at second hinge from bottom. Where electric hinges are used in conjunction with exit devices, locate hinge nearest to exit device.

D. Provide mortar guard similar to McKinney MG-16 for each electric hinge specified.

2.4 ELECTRIC POWER TRANSFERS

A. Acceptable manufacturers:
1. Abloy EPT/EPTL
2. Adams Rite 4612
3. Von Duprin EPT-2/EPT-10

B. Provide electric power transfer device(s) as specified in hardware groups or as required by electrified hardware voltage requirements.

C. When specifically indicated, provide surface-mounted armored power transfer loop(s) with length to accommodate door opening conditions.

2.5 LOCKSETS – CYLINDRICAL (HEAVY DUTY)

A. Acceptable Manufacturer and Series:
   1. Best: 93K-15D
   2. Corbin Russwin: CL33 x NZD
   3. SARGENT: 10-Line x LL
   4. **Schlage: ND-RHO**
   5. Yale: 5400LN x AU

B. Provide heavy-duty cylindrical locks unless indicated otherwise with functions specified in Hardware Groups and with the following provisions:
   1. Cylinders: Provide cylinders, as required, to accomplish specified lock function. (Refer to Part 2 - KEYING.)
   2. Backsets: 2-3/4 inches.
   3. Strikes: Provide wrought boxes and strikes with proper lip length to protect trim but not to project more than 1/8 inch beyond trim, frame or inactive leaf. Where required, provide open back strike and protected to allow practical and secure operation.
   4. ANSI functions – cylindrical locks.
      a. Passage – F75
      b. Privacy – F76
      c. Office – F82
      d. Classroom – F84
      e. Storeroom – F86

2.6 ELECTRIC STRIKES

A. Acceptable Manufacturers and Series:
   1. HES 1006 Series (mortise); Genesis 9500/9600 (surface-mounted)
   2. Folger-Adam 310 Series
   3. **Von Duprin 6000 Series**

B. Provide electric strikes designed for use with latch/lock type shown at each specified opening.

C. Electric Strikes shall be UL Listed as Burglary-Resistant Electric Door Strikes and, where required, shall be UL Listed as Electric Strikes for Fire Doors and Frames. Provide fail-secure (non fail-safe) type electric strikes, unless specified otherwise.

D. Provide power supply, transformer, and rectifier for each strike as required, unless indicated otherwise. Verify voltage with electrical contractor.

E. Provide spacer plates and accessories as required for installation to suit details.

2.7 KEYING

~~A. Key new locks/cylinders in groups and provide new master key, grandmaster key, or great-grandmaster key system, as determined and directed by Owner. Factory key all cylinders with manufacturer retaining permanent keying records. If requested, provide Owner with copy of bitting list via Owner-acceptable delivery method.~~ Contractor to provide construction cores for doors necessary to secure the facility during construction. Specific to lockset cylinder cores only; keying and cylinder installation shall be provided by the County of San Mateo Facilities, Maintenance and Operations (FM&O) Lock Services. Construction Cores will be returned to contractor after installation of Owner's permanent cores.

CO 1

B. Authorized local distribution/service shall be available for purchase of additional keys & cylinders to allow for system revisions, expansion, and service, as required.

C. A keying meeting shall be scheduled to determine specific Owner/facility/user keying requirements. Mechanical keying shall be coordinated with electronic access control system components (if utilized) to ensure intended security and traffic control requirements. Attendees shall include Owner/facility/user representative(s), lock and cylinder manufacturer/supplier representative(s), and security contractor representative (if electronic access control and/or security systems are utilized). Advise Architect and Contractor of scheduled date, time, place, and attendees.

D. If requested, submit proposed keying schedule to Architect and meet with Owner and Architect to review schedule.

E. Provide construction masterkeying. Permanent cylinders/cores shall be installed/activated upon completion of the project.

F. Provide 6 masterkeys for each masterkey set. Provide 3 change keys for each lock. Stamp keys "DO NOT DUPLICATE." When interchangeable core cylinders are specified, provide 2 control keys for core removal.

G. All keys shall be delivered to the designated Owner's representative via method determined and agreed upon by the Owner at the keying meeting.

2.8 DOOR TRIM

A. Acceptable Manufacturers and Types:

Burns	Hiawatha	Rockwood	Trimco	
56	200H	70E	1001-9	6" x 16" push plate
54	200F	70C	1001-3	4" x 16" push plate
422	1081LBP	47	1741	1" diameter push bar
39C	658A	BF157A	1191-3	1" diameter, 10" CTC, offset pull
26C	536B	111	1195-2	1" diameter, 10" CTC, straight pull
25B	523A	107	1194-2	3/4" diameter, 8" CTC, straight pull
301/302	DES-1A/DES-2A	304/305	KE31-1/KE32-1	non-mortise edge guard
			PG8002	bottom rod & latch protector

B. Push Plates: Minimum of 0.050 inch thick, beveled 4 edges.
   1. Hiawatha type 200H - 6 inches by 16 inches, unless otherwise indicated.
   2. Where width of door stile prevents use of 6 inch wide plate, provide push plate one inch less than width of stile but not less than 4 inches wide.

C. Push Bars:
   1. Hiawatha type 1081LBP, unless otherwise indicated.
   2. Length of push bars shall be sufficient to mount each end on center of door stile. Push bars on flush doors shall be 3 inches less than door width.
   3. Use concealed mounting and mount back-to-back with pulls.

D. Pulls:
   1. Hiawatha Series 658A, unless otherwise indicated.
   2. Use concealed mounting and mount back-to-back with push bars.

E. Door Protection Plates and Edge Guards:
   1. Kick Plates and Armor Plates: Minimum of 0.050 inch thick, beveled 4 edges.
      a. At single doors provide width 1-1/2 inches less than door width on push side. If indicated for pull side, provide 1 inch less than door width. If edge guards are specified, see edge guard paragraph below for sizing requirements.
      b. At pairs of doors provide width 1 inch less than door width on both doors. If edge guards are specified, see edge guard paragraph below for sizing requirements.
      c. Provide kickplate height of 10 inches, mop plate height of 6 inches, and armor plate height of 34 inches, unless otherwise indicated.
   2. Mop Plates (pull-side mounting): Minimum of 0.050 inch thick, beveled 4 edges.
      a. At single doors provide width 3/4 inches less than door width.
      b. At pairs of doors provide width 1/2 inches less than door width.
   3. Edge Guards: Minimum .050" thick, stainless steel.
      a. Hiawatha type DES-1A/DES-2A x 34 inches high, or as noted in Hardware Groups.
      b. When edge guards are specified in conjunction with kick and/or armor plates, coordinate widths of protection products with door widths to result in a continuous smooth surface with no more than 1/8 of an inch between the edge of the edge guard and the edge of the kick/armor plate. Overlapping of edge guards and kick/armor plates will not be permitted.

c. Coordinate sizing of edge guards with door & frame supplier/manufacturer to ensure that opening clearances prevent binding and/or rubbing of the swinging door.

4. When door protection plates and/or edge guards are specified for fire-rated openings, they shall be installed in accordance with the listing of the door. Field-installed products must be labeled and installed in accordance with manufacturers' listings.
5. Do not provide kick-plates, armor-plates, or edge guards for door types specified with impact-resistant materials (such as "Acrovyn").

2.9 DOOR CLOSERS

A. Acceptable Manufacturers and Types of Exposed Closers:

1. Heavy-Duty
   a. LCN 4040/4040XP
   b. Norton 7500/PR7500
   c. SARGENT 281/281 P-10

B. Provide heavy-duty non-sized closers, unless indicated otherwise in Hardware Groups, adjustable to meet maximum opening force requirements of ADA and CBC, and to meet the following requirements:

1. Maximum opening force:
   a. Exterior doors: 5 lbs.
   b. Interior doors: 5 lbs.
   c. Fire-rated doors: 15 lbs.
2. Door sweep period: Minimum 3 seconds from open position of 70 degrees to a point 3 inches from latch measured to leading edge of door. (1133B2.5.1)

C. Provide heavy-duty drop plates, brackets, or adapters for arms as required to suit details.

D. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors, unless indicated otherwise.

E. Provide back-check for closers.

F. Provide heavy-duty mechanical holder arms where holder function is indicated.

G. Provide closers for doors as noted in Hardware Groups and, in addition, provide closers for labeled doors whether or not specifically noted in group.

H. Provide closers meeting the requirements of UBC 7-2 and UL 10C positive pressure tests.

2.10 BI-FOLDING DOOR HARDWARE

A. Acceptable Manufacturers and Models:

Hager	Johnson	PC Henderson	Stanley
9870 Series	100FD Series	HF4/100A	BFC125 Series

B. Provide complete hardware sets for each opening specified with bi-folding door hardware.

1. Include track, hangers, fasteners, guides, and all hardware required for a complete installation.

2.11 OVERHEAD STOPS

A. Acceptable Manufacturers and Types:

ABH	Glynn-Johnson	Rixson	SARGENT	
4400	450 series	10	1540	standard duty, surface
4000	410 series	2	1530	standard duty, concealed
9000	90 series	9	590	heavy duty, surface
1000	100 series	1	690	heavy duty, concealed

B. Provide surface-mounted overhead stops for doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall or for doors that open against equipment, casework, sidelights, or other objects that would make wall stops inappropriate. A closer stop arm is an acceptable option instead of overhead stops at interior doors with parallel arm closer mountings.

C. Where overhead stops are required by opening conditions, as defined above, provide heavy-duty overhead stops for doors that are over 39 inches wide and for exterior doors. A heavy-duty closer compression stop arm (equivalent to SARGENT CPS arm) is an acceptable option for overhead stops at exterior doors with parallel arm closer mountings.

D. Provide hold-open function where indicated at non-label doors.

E. Provide sex bolt attachments for mineral core wood door applications.

2.12 WALL STOPS AND HOLDERS

A. Acceptable Manufacturers: Provide Ives products, as indicated, or equivalent products by Burns, Hager, or Trimco.

B. Provide wall bumper (WS407CCV or approved equivalent) for each door leaf except where wall stops (WS11/WS11X or approved equivalent) are specified in the Hardware Groups, or where opening conditions require the use of an overhead stop. (Refer to Part 2 – OVERHEAD STOPS)

C. Provide an overhead stop mechanism (Refer to Part 2 – OVERHEAD STOPS) for doors in which the door face or operating trim on the leading/latch edge DOES NOT open against wall, and/or for doors that swing more than 140-degrees before striking a wall (unless 180-degree door swing is indicated). Refer to degree of opening as shown on plan. Special conditions will be indicated by notes on the Opening Schedule.

D. Provide heavy-duty base stop & manual holder function (WS20/WS20X or approved equivalent) where indicated for non-label doors.

E. Provide heavy-duty automatic wall holder (WS45/WS45X or approved equivalent) where indicated for non-label doors.

2.13 WEATHERSTRIP AND THRESHOLDS

A. Acceptable Manufacturers: Provide Pemko products as indicated, or equivalent products by Hager, National Guard Products, Reese Enterprises, or Zero. Refer to drawings for special details. Provide accessories, shims and fasteners.

1. Provide self-tapping fasteners for products being applied to hollow metal doors and frames.

B. Where weatherstrip and thresholds are assigned by hardware group modifier "W", provide the following.

1. Thresholds: 171A at exterior locations and 271A at interior locations, unless detailed otherwise.
   a. Refer to drawings for special details. Provide accessories, shims and fasteners.
   b. Where thresholds occur at openings with one or more mullions, they shall be cut for the mullions and extended continuously for the entire opening.
2. Door Bottom/Sweep: 315_N, unless detailed otherwise (both doors of pairs)
3. Weatherstrip: 316_V frame-applied, unless detailed otherwise
4. Rain Drip: 346_ x full frame width, unless detailed otherwise
5. Astragal: 18041_P split type (for each door of pairs with both doors active) or S88D gasket (applied to fixed astragal by door supplier for active/inactive pairs), unless detailed otherwise.

2.14 GASKET

A. Acceptable Manufacturers: Provide Pemko products as indicated, or equivalent products by Hager, National Guard Products, Reese Enterprises, or Zero. Refer to drawings for special details. Provide accessories, shims and fasteners.

B. Where smoke gasket is specified or required by fire-rating criteria, provide PK55D, unless detailed otherwise.

C. Provide gaskets for 20-minute doors and for doors designated for smoke and draft control as required by local codes and/or door manufacturer. Also include astragal and/or gasket as required for meeting edges of pairs.

D. Where frame-applied intumescent seals are required by the wood door manufacturer, provide gaskets that comply with UBC 7-2 and UL-10C positive-pressure testing.

2.15 DOOR POSITION SWITCHES

A. Acceptable Manufacturers and Types:
   1. Ademco (ADI 800-233-6261): 944SP-WH 3/4-in recessed white
   2. Detex: MS-2049F
   3. SARGENT: 3287
   4. Sentrol: 1078

B. Coordinate door and frame preparations with door and frame suppliers.

C. Switches shall be installed in frame head approximately 4" from latching edge of door, unless detailed otherwise.

2.16 LATCH PROTECTORS

A. Acceptable Manufacturers and types:
   1. Don-Jo CLP-110-32D
   2. M.A.G. 8851-S
   3. Rockwood 320-32D

B. Latch protectors shall be stainless steel of the type applicable for the specified latch.

2.17 ONE-WAY VIEWERS

A. Acceptable Manufacturers and Types:
   1. Hager 1755
   2. Rockwood 620/621
   3. Trimco 975U

B. Provide solid brass UL listed allowing minimum 150 degree angle view.

2.18 FASTENERS

A. Including, but not limited to; wood or machine screws, special screws, bolts, special bolts, nuts, expansion shields, anchors, and other accessory items of proper type, material, and finish required for complete operational installation of hardware.

B. Use phillips head for exposed screws. Do not use aluminum screws to attach hardware.

C. Provide self-tapping (TEC) screws for attachment of sweeps and stop-applied weatherstripping.

2.19 TYPICAL FINISHES AND MATERIALS

A. Finishes, unless otherwise specified:
   1. Butts: Outswinging Exterior Doors
      a. US32D (BHMA 630) on Stainless Steel
   2. Butts: Interior Doors and Inswinging Exterior Doors
      a. US26D (BHMA 652) on Steel
   3. Continuous Geared Hinges:
      a. US28 (BHMA 628) on Aluminum
   4. Continuous Stainless Steel:
      a. US32D (BHMA 630) on Stainless Steel
   5. Pivots:
      a. US26D (BHMA 626) on Brass or Bronze
   6. Flush Bolts:
      a. US26D (BHMA 626) on Brass or Bronze

7. Exit Devices:
   a. US32D (BHMA 630) on Stainless Steel
8. Locks and Latches:
   a. US26D (BHMA 626) on Brass or Bronze
9. Push Plates, Pulls and Push Bars:
   a. US32D (BHMA 630) on Stainless Steel
10. Coordinators:
   a. US28 (BHMA 628) on Aluminum
11. Kick Plates, Armor Plates, and Edge Guards:
   a. US32D (BHMA 630) on Stainless Steel
12. Overhead Stops and Holders:
   a. US26D (BHMA 626) on Brass or Bronze
13. Closers: Surface mounted.
   a. Sprayed Lacquer or Powder Coat to Match.
14. Latch Protectors:
   a. US32D (BHMA 630) on Stainless Steel
15. Miscellaneous Hardware:
   a. US26D (BHMA 626) on Brass or Bronze

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine doors, frames, and related items for conditions that would prevent the proper application of finish hardware. Do not proceed until defects are corrected.

3.2 INSTALLATION

A. Install finish hardware in accordance with reviewed hardware schedule and manufacturer's printed instructions. Prefit hardware before finish is applied, remove and reinstall after finish is completed. Install hardware so that parts operate smoothly, close tightly and do not rattle.

B. Installation of hardware shall comply with NFPA 80 and NFPA 101 requirements.

C. Set units level, plumb and true to line and location. Adjust and reinforce attachment to substrate as necessary for proper installation and operation.

D. Screws for hinges and lock fronts in wood doors shall have pilot holes pre-drilled to avoid splitting doors. Do not over-drill pilot holes or over-torque installation of screws.

E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. For doors with door pulls and push plates, Install door pulls with through bolted fasteners countersunk and flush with door face. Then install push plates over countersunk through bolts so they are concealed by push plate.

G. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant, forming tight seal between threshold and surface to which set. Securely and permanently anchor thresholds, using countersunk non-ferrous screws to match color of thresholds (stainless steel screws at aluminum thresholds).

H. Lead Protection: Lead wrap hardware penetrating lead-lined doors. Levers and roses to be lead lined. Apply kick and armor plates with 3M adhesive #1357, as recommended by 3M Co., on lead-lined doors.

3.3 FIELD QUALITY CONTROL

A. After installation has been completed, provide services of qualified hardware consultant to check Project to determine proper application of finish hardware according to schedule. Also check operation and adjustment of hardware items.

B. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.4 ADJUSTING AND CLEANING

A. At final completion, hardware shall be left clean and free from disfigurement. Make final adjustment to door closers and other items of hardware. Where hardware is found defective repair or replace or otherwise correct as directed.

B. Adjust door closers to meet opening force requirements of Uniform Federal Accessibility Standards.

C. Adjust door closers to meet opening force requirements of Uniform Federal Accessibility Standards and opening force requirements of CBC1133B.2.5.

D. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of space or area, return to work during week prior to acceptance or occupancy, and make final check and adjustment of hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors.

E. Instruct Owner's personnel in proper adjustment and maintenance of door hardware and hardware finishes.

F. Clean adjacent surfaces soiled by hardware installation.

3.5 PROTECTION

A. Provide for proper protection of hardware items until the Owner accepts Project as complete.

3.6 HARDWARE GROUP MODIFIERS

A. Hardware Group modifiers added to numeric hardware group assignments on the schedule of openings indicate a variation to the group as defined below.

"E" – Fail-secure (non-fail-safe) electric strike to be provided by Security Contractor, unless noted otherwise. For pairs of doors without a mullion, a continuous current electric power transfer device or hinge will also be provided. See electrical for voltage requirements. Coordinate necessary preps and reinforcements with door and frame suppliers. Also provide lockguard/latchguard to prevent tampering with the electric strike.

Connection by Electrical.

Electronic access control system & devices, power supply (for electric strike), request-to-exit device(s), and monitoring/alarm(s) are provided by Security Contractor, unless noted otherwise.

Refer to security documents for location(s) and type(s) of electronic control(s).

OPERATIONAL DESCRIPTION: Door is normally closed and mechanically locked on the outside. Manual exit is possible at all times. Electronic access control system secures and releases electric strike to control entry. When secured, presenting authorization temporarily releases electric strike to allow entry. **Power off secures electric strike. (fail-secure entry)**

Interruption of power and/or fire-alarm event secures electric strike resulting in door being positively latched and locked on the outside – requiring key for entry.

"M" – Add mechanical holder function for non-rated doors. (both leaves of pairs, unless indicated otherwise) Provide holder feature for closer or for overhead stop, unless noted otherwise. Refer to Part 2 – CLOSERS and Part 2 – OVERHEAD STOPS.

"P" – Add door position switch/contact for doors being monitored/alarmed (both leaves of pairs). Refer to Part 2 - DOOR POSITION SWITCHES. Connection by Electrical. NOTE: When assigned to hardware groups 1 or 2, door position switch is to be provided by the associated door supplier/manufacturer.

"**W**" – Add weatherstrip, sweep(s) and rain drip (where applicable). For pairs with fixed astragal by door supplier, furnish/apply gasket strip similar to Pemko S88D. For pairs with both doors active, provide split astragal similar to Pemko 18041_P for each leaf. (Refer to Part 2 – WEATHERSTRIP & THRESHOLDS.)
At aluminum assemblies, add rain drips (where applicable and not part of aluminum frame assembly – match door & frame finish), thresholds and sweep(s) – integral weatherstrip is provided by door manufacturer.

3.7 HARDWARE GROUPS

A. Provide all required door hardware for each specified opening to comply with requirements of this section in its entirety (Parts 1, 2, and 3). Included are desired/intended functions, acceptable manufacturers and models, systems coordination, etc. for a complete installed opening.

B. Refer to the openings schedule for hardware group and modifier(s) assigned to each door opening. Ignore hardware groups and modifiers not assigned on the openings schedule.

GROUP 3.03 – Existing opening: replace existing keyed cylinder(s) with new keyed cylinder(s) and integrate keying with new key system

Provide new keyed cylinder for existing locking device. Field verify existing lock requirements for new keyed cylinder.
Balance of hardware is existing, to remain, unless specifically noted otherwise.
NOTE 1: At door #104, provide new classroom function lock. Field verify existing lock type & door prep.
NOTE 2: At door #008, field verify existing storeroom function lock, or provide new storeroom function lock based on existing lock type & door prep.

GROUP 3.07 – Existing opening, replace existing lock/latch with Store function, balance of hardware to remain

1 each Lockset Store function
Function: Latchbolt is retracted by lever either side when unlocked. Key on either side locks or unlocks both levers. Deadlocking latchbolt.
Verify function per compliance with local building codes.
Balance of hardware is existing – to remain.
Existing lock/latch to be returned to Owner after removal.
Field repair/finish door & frame as necessary for "like new" appearance.
NOTE: Field verify existing door & frame preps per compatibility with new lock/latch assembly.

GROUP 3.12 – Existing opening, confirm existing classroom lock function (or replace with new classroom function lock), key to new key system as specified/directed, balance of hardware is existing, to remain.

1 each Lockset Classroom Function
Function: Latchbolt is retracted by lever on either side unless outside lever is locked by key. Key outside locks or unlocks outside lever. Deadlocking latchbolt. (If existing lock is classroom function, replace existing keyed cylinder with new keyed cylinder as directed.)
Balance of hardware is existing – to remain, as is.
NOTE: Field verify existing door & frame preps per compatibility with new lock/latch assembly.

GROUP 3.15 – Existing single opening: field verify existing lock function, integrate keying with new key system as directed.

Door, frame, and hardware are existing, to remain, unless indicated otherwise.
Field verify existing lock function, and advise architect.
Replace keyed cylinder and/or rekey as directed.

GROUP 5.11 – Bi-fold door hardware (2-leaf, standard-duty commercial grade)

1 set Bi-Fold Hardware
1 each Wire Pull (1 for each 2-leaf set)

GROUP 7.93 – Existing sliding bi-passing door & hardware assembly (existing to remain)
Existing components to remain, unless directed otherwise.
Field inspect and advise architect of faulty/damaged compone nts.

GROUP 9.02 – Keyed cylinder for locking device provided with gate/fence assembly
1 each Cylinder (Integrated with new key system.)
Verify cylinder requirements for locking device provided with gate/fence assembly.

GROUP 11 – Privacy function, no closer
Hinges
1 each Lockset Privacy function
Function: Latchbolt is retracted by lever on either side unless inside turn lever (mort) or push button (cyl) locks outside lever. Turn lever is released and push button is released by rotating inside lever or by closing door. Outside emergency release mechanism unlocks outside lever. (via coin, screwdriver, or key)
1 each Stop (as required by opening conditions)

GROUP 13 – Classroom function, no closer
Hinges
1 each Lockset Classroom Function
Function: Latchbolt is retracted by lever on either side unless outside lever is locked by key. Key outside locks or unlocks outside lever. Deadlocking latchbolt.
1 each Stop (as required by opening conditions)

GROUP 14 – Storeroom lever lock, no closer
Hinges
1 each Lockset Storeroom function
Function: Latchbolt is retracted by inside lever only. Outside lever is always LOCKED. Key outside retracts latchbolt. Deadlocking latchbolt.
1 each Stop (as required by opening conditions)

GROUP 31 – Privacy with closer
Hinges
1 each Lockset Privacy function
Function: Latchbolt is retracted by lever on either side unless inside push button (cyl) or turn lever (mort) locks outside lever. Push button or turn lever is released by depressing inside lever or by closing door. Outside emergency release unlocks outside lever.
1 each Closer
1 each Kickplate
1 each Stop (as required by opening conditions)

GROUP 33 – Classroom with closer
Hinges
1 each Lockset Classroom Function
Function: Latchbolt is retracted by lever on either side unless outside lever is locked by key. Outside key locks or unlocks outside lever. Deadlocking latchbolt.
1 each Closer
1 each Kickplate
1 each Stop (as required by opening conditions)

GROUP 34 – Storeroom lock with closer
Hinges
1 each Lockset Storeroom Function
Function: Latchbolt is retracted by inside lever only. Outside lever is always LOCKED. Key outside retracts latchbolt. Deadlocking latchbolt.
1 each Closer

1 each Kickplate
1 each Stop (as required by opening conditions)

GROUP 34.84 – Storeroom lock with closer, weatherseal, and door contact. ALARM SYSTEM & SIGNAGE "BY OWNER"

Hinges
1 each Lockset Storeroom Function
Function: Latchbolt is retracted by inside lever only. Outside lever is always LOCKED. Key outside retracts latchbolt. Deadlocking latchbolt.
1 each Closer
1 each Stop (as required by opening conditions)
1 each Door Contact/Position Switch (concealed)
1 each Threshold (as specified/shown)
1 each Door Sweep/Bottom (as specified/shown)
1 set Weatherstrip Seal (for jambs & head as specified/shown)
OPERATIONAL DESCRIPTION: Door is normally closed & latched. Alarm (by Owner) is normally armed to control travel in both directions. Signage (by Owner) on both sides of door states: "EMERGENCY PASSAGE ONLY. ALARM WILL SOUND. "
Exit is possible at all times by rotating inside lever, but opening door sounds ALARM when armed.
Entry by authorized key is possible at all times, but opening door sounds ALARM when armed.

GROUP 100 – Single push-plate & pull-plate with closer

Hinges
1 each Push-Plate (6-in x 16-in with beveled edges)
1 each Pull-Plate (3/4-in diam with 8-in ctrs and 4-in x 16-in plate)
1 each Closer
1 each Kick-Plate
1 each Stop (as required by opening conditions)

GROUP 200.01 – Electric lock (fail-secure entry) via electronic access control system with closer

Hinges
1 each Electric Hinge
1 each Electric Lockset (fail-secure)
Function: Latchbolt is retracted by lever inside or key outside. Outside lever is LOCKED, unless unlocked electrically. Power off locks outside lever.
1 each Closer
1 each Kickplate
1 each Stop (as required by opening conditions)
1 each Door Position Switch/Contact
Electronic access control system, power supply (for electric lock), request-to-exit device(s), and monitoring/alarm(s) are provided by Security Contractor. Refer to security documents for location(s) and type(s) of control(s).
Connection by Electrical.
OPERATIONAL DESCRIPTION: Door is normally closed and latched. Manual exit is allowed at all times by rotating inside lever.
Entry is controlled by electronic access control system which secures/locks and releases/unlocks outside lever for predetermined periods of time. When secured/locked, presenting authorization temporarily unlocks outside lever to allow entry.
Interruption of power secures/locks outside lever requiring key for entry. (fail-secure entry)

GROUP 401.01 – Passage lever latch with automatic operator & electric strike (fail-secure)

Hinges
1 each Latchset Passage function
Function: Latchbolt is retracted by lever on either side.
1 each Electric Strike (fail-secure)
1 each Automatic Operator (by Section 087113)
2 each Actuators (by Section 087113)
1 each Kickplate
1 each Stop (as required by opening conditions)

1 each Power Supply (for electric strike, if not included with automatic operator assembly) Connection by Electrical.

OPERATIONAL DESCRIPTION: Door is normally closed & latched. Manual exit and entry are possible at all times by rotating either lever. Depressing wall actuator switch on either side of opening temporarily releases the electric strike and then opens the door automatically.

NOTE 1: Interruption of power (or fire-alarm event at fire-rated openings) secures the electric strike and deactivates the automatic operator to close and positively-latch the door.

NOTE 2: When door L01 and/or L02 are open, adjacent automatic lift is inoperable.

END OF SECTION

SECTION 088000
GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Monolithic vision glass.
      a. Laminated glass.
   2. Insulated vision glass.
      a. Insulated laminated glass
   3. Glass mirrors.
   4. Accessories, glazing and setting materials.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 079000 – Joint Protection.
   3. Section 081400 – Wood Doors.
   4. Section 085313 - Vinyl Windows.
   5. Section 102813 – Toilet Accessories: Metal-framed mirror units.

1.2 DEFINITIONS

A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

C. Deterioration of Laminated Glass: Defects developed from normal use attributed to the manufacturing process and not to causes other than glass breakage and practices for 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.

D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      a. Specified Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on Drawings.
      b. Specified Design Seismic Loads: Determine design seismic loads applicable to Project, required by ASCE 7 and Section 017325

c. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
   1) Load Duration: 60 seconds or less.
d. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
   1) For monolithic-glass lites heat treated to resist wind loads.
   2) For insulating glass.
   3) For laminated-glass lites.
e. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.

C. Seismic Movements: Glass in glazed curtain walls, glazed storefronts and glazed partitions shall meet relative displacement requirements to resist fallout as indicated in Section 017325 in accordance with ASCE 7, Section 13.5.9.

D. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F , ambient; 180 deg F, material surfaces.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
   1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
   2. For laminated-glass lites, properties are based on products of construction indicated.
   3. For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2-inch- wide interspace.
   4. Center-of-Glass U-Values: NFRC 100 methodology using LBL WINDOW 6.3 computer program, expressed as Btu/ square foot x h x degree F.
   5. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL WINDOW 6.3 computer program.
   6. Solar Optical Properties: NFRC 300

1.4 APPLICABLE STANDARDS

A. Safety Glazing: Conform to Safety Standard for Architectural Glazing Materials (CPSC 16 CFR 1201). Tempered glass and wire glass shall conform to requirements of ANSI Z97.1, with permanent label in accordance with statutes.

B. ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation *(replaces ASTM E773, E774 CBA, CAN / CGSB 12.8)*Flat Glass: ASTM C 1036, Flat Glass. Flat Glass Marketing Association (FGMA) Glazing Manual.

C. Heat Treated Flat Glass: ASTM C 1048, Heat Treated Flat Glass.

D. Laminated Glass: ASTM C 1172 – Standard Specification for Laminated Architectural Flat Glass; Comply with applicable quality requirements for cut sizes of flat laminated glass consisting of two or more lites of glass bonded with interlayer material for use in building glazing.

1.5 SUBMITTALS

A. Product Data: Provide for structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

B. Shop Drawings:
   1. Review curtain wall and window shop drawings and submit acceptance of details as suitable for proposed glass products.
   2. Submit shop drawings indicating sliding glass door tracks.

C. Calculations: Structural design shall be performed by a Professional Engineer, licensed in the state where Project is located. Signed engineering calculations shall be submitted to Architect/Engineer

1. Structural design calculations are required per IBC Section 2403, for glass not supported on 4 sides, including glass supports and framing, indicating structural integrity of glass size, glass support members, anchors, fasteners and connections to building, in accordance with specified criteria.
2. Structural design calculations for seismic design forces and relative displacements are required for glass in glazed curtain walls, glazed storefronts and glazed partitions in accordance with Section 017325.
3. Engineering Responsibility: Calculations shall be reviewed for stated design assumptions, general compliance to specified requirements, and forces imposed on glass structure. The accuracy of the design calculations shall be the sole responsibility of the Contractor's Professional Engineer.

D. Samples: Submit samples of sandblasted/frosted, spandrel, decorative and wire glass, and glazing sealant, for color selection and appearance acceptance.

E. Insulating Glass Certification: Submit data verifying compliance with IGCC, Class A level.

F. Compatibility Certification: After testing and review, certify compatibility of materials in contact and in close proximity to glazing sealant materials.

G. Wind Pressure and Thermal Stress Analysis: Submit thermal stress analysis of glass where thermal stress may occur.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

C. Single Source Responsibility: Provide materials obtained from one source for each type of insulating glass and glazing product indicated.

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252

E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

F. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.
1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency:
1. Insulating Glass Certification Council.

1.7 PRODUCT HANDLING

A. Deliver and store glass and glazing in manufacturer's protective covering. Handle glass and glazing with care to prevent damage.

1.8 PROJECT/SITE 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 liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 GLASS WARRANTY

A. Warranty for Insulating Units: Warranty sealed insulating glass units for minimum period of ten (10) years, with manufacturer's replacement guarantee, covering as minimum: Defective or failure of seal; material vision obstruction as result of dust collection or film formation between panels or other similar failure and the following specific conditions:

1. In addition to replacement of insulated units, provide removal and reinstallation of new units without cost to Owner during first five (5) years of guarantee.

B. Laminated Glass Warranty: Laminated glass that delaminates shall be replaced at no charge (material only) for minimum 5 years beginning on date of Substantial Completion.

C. Glazing installer shall coordinate glass and glazing installation with framing systems, and install glass and glazing in accordance with manufacturer's instructions, so that guarantee is maintained.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers for Glass Substrate:

1. AFG Industries.
2. ACH Float Glass Operations (Versalux)
3. Guardian Industries.
4. Pilkington.
5. PPG Industries Glass Group.

B. Acceptable Fabricators for Insulated Glass Units:

1. Any manufacturer/fabricator with "CBA" classification.

2.2 SINGLE GLASS

A. (GL-1) Clear Float Glass: 1/4 inch thickness; comply with ASTM C1036, Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).

1. (GL-1T) Clear Tempered Glass: 1/4 inch thickness; comply with ASTM C1036, Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), and further processed to comply with ASTM C1048, Kind FT (fully tempered).

2.3 LAMINATED MONOLITHIC GLASS

A. (GL-15) Laminated Clear Glass: 1/4 inch thick laminated glass, 2 layers of 1/8 inch clear glass laminated with 0.030 inch clear PVB inner layer. Edges ground smooth for exposed conditions.

2.4 INSULATING GLASS

A. (GL-21) Clear Low-E Insulated Glass Unit: One inch thick unit constructed of 1/4 inch clear exterior light, 1/2 inch air space using fabricators warm edge spacer, and 1/4 inch clear interior. High performance low-emissivity coating on No. 2 surface and argon gas in cavities. Glass thickness and thickness of individual glass plies are minimum. One or both plies heat strengthened where required for wind pressure or thermal stress.

1. Visible transmittance: 70 percent.
2. Shading coefficient: 0.43
3. Nighttime Winter U-value: 0.25 BTU/hour/square foot maximum.
4. Acceptable products:
   a. Viracon: Solarscreen 2000, VE 1-2M.
   b. Comparable product of other specified manufacturers.

B. (GL-21T) Clear Tempered, Low-E Insulated Glass Unit: One inch thick unit constructed of 1/4 inch clear tempered exterior light, 1/2 inch air space using fabricators warm edge spacer, and 1/4 inch clear tempered interior light. Low-emissivity coating on No. 2 surface and argon gas in cavity. Glass thickness and thickness of individual glass plies are minimum.

1. Acceptable products:
   a. Viracon: Solarscreen 2000, VE 1-2M.
   b. Comparable product of other specified manufacturers.

2.5 FIRE-RATED GLAZING

A. (GL-61) Monolithic Ceramic Glazing: Proprietary product in the form of clear flat sheets of 3/16-inch (5-mm) nominal thickness weighing 2.5 lb/sq. ft. (12.2 kg/sq. m), and as follows:

1. Fire-Protection Rating: As indicated for the fire window in which the glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
2. Textured on one surface, translucent.
3. Polished on both surfaces, transparent.
4. Unpolished on both surfaces, transparent.
5. Product: Subject to compliance with requirements, provide the following product manufactured by Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products:
   a. "Obscure FireLite" (textured).
   b. "Premium FireLite" (polished on both surfaces).
   c. "Standard FireLite" (unpolished on both surfaces).
6. Other Acceptable Manufacturer: Vetrotech Saint-Gobain.

2.6 MIRRORS

A. (GL-91) Unframed Clear Glass Mirrors: Conforming to ASTM C1503, Mirror Select Glazing Quality. 1/4 inch thick (6.0 mm) Type 1, Class 1, Quality q1. Manufacture using copper-free and low-lead mirror coating process. Provide 5 year warranty.

1. Edge Treatment: Polished mitered edges.
2. Mounting Accessories: Brushed stainless steel (Type 302) mirror clips similar to KV277 at bottom and KV278 at top where indicated.
3. Concealed fasteners: Mirror mastic as recommended for applicable for specific substrate and mirror configuration, unless otherwise indicated.

B. (GL-92) Unframed Mirrors Annealed Laminated Float Glass: 1/4 inch laminated glass mirror ASTM C1503, Type I, transparent flat glass, Quality-Q3; Class 1, clear.

2.7 ACCESSORIES

A. Framing for Butt Glazing: Aluminum or stainless steel angles as indicated. Anchor to ceiling and floor substrates with appropriate fasteners in locations as indicated.

B. Setting Blocks: 100% silicone with a durameter hardness of 85±5, chemically compatible with glazing sealant or compound, length as recommended by glass manufacturer.

C. Spacers and Shims: 100% silicone with a durameter hardness of 85±5, chemically compatible with glazing sealant or compound, length as recommended by glass manufacturer.

D. Glazing Tape: Butyl or silicone preshimmed tape similar to Tremco 440 Tape.

2.8 EXTERIOR GLAZING

A. Glazing gaskets, sealant backers within glazing pockets, and continuous glass spacer pads at structural silicone shall be black heat cured silicone rubber conforming to ASTM C1115-00, Type C. Norton V2100 Thermalbond Tape is acceptable as a glass spacer pad when used in conjunction with structural silicone.

B. Gaskets for dry glazed system shall be silicone, EPDM, neoprene or Santoprene. Sponge gaskets shall be extruded black neoprene with hardness of 40 +/- 5 durometer Shore A and conforming to ASTM C 509-00. Design sponge gaskets to provide 20% to 35% compression. Dense gaskets shall be black extrusions with Shore A hardness of 75 +/- 5 for hollow profiles and 60 +/- 5 for solid profiles, and conforming to ASTM C1115-00, Type C or to ASTM C 864-99. Injection mold corners of gaskets where compatible with installation procedures.

C. Structural Glazing System:
   1. Sealant: GE Ultraglaze SSG 4000 by General Electric or 795 by Dow Corning. Verify compatibility of sealant with secondary seal of dual seal insulating glass system.
   2. Maximum design stress on Structural Silicone Sealant shall not exceed 20 ps

2.9 INTERIOR GLAZING

A. Type and Manufacturer: Mono one-part acrylic-terpolymer sealant or Proglaze silicone sealant by Tremco, color as selected from manufacturers standard colors.

B. Other Acceptable Manufacturers: General Electric, DAP, PTI, Pecora.

C. Fire-Rated Glazing System: As recommended by fire-rated glass manufacturer.

D. Butt Glazing System: Tremco silicone structural "butt" glazing system, color as selected from manufacturer's standard range.

2.10 FABRICATION

A. Heat-Treated Float Glass: ASTM C 1048. Fabricate using horizontal roller heating process only. Roll wave distortion parallel to bottom edge of glass as installed. Deviation from flatness at any peak (peak to valley deviation): shall not exceed 0.003 inches in the center of a lite and shall not exceed 0.008 inches within 10.5 inches of the leading or trailing edge.

B. Insulating Glass Units:
   1. Fabricate using both primary and secondary seals and as otherwise required to comply with the IGCC CBA classification.
   2. Fabricate using glass from the same manufacturer throughout the Project.
   3. Seal Construction: Dual seal design with primary seal of PIB and Silicone Secondary Seal, unless specifically indicated otherwise.

A. Edge Finishing: Fabricate finished edges to produce smooth, polished edges without chips, scratches, or warps.
   1. Non-Exposed Finished Edge, Typical: Flat polished.
   2. Butt-Glazed Lites: 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.
   3. Exposed Edges: Grind smooth and polish exposed glass edges and corners, unless noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
   1. Verify glazing channels are free of burrs, irregularities, and debris.
   2. Verify glass is free of edge damage or face imperfections.
   3. Inspect door and frames to determine that frames, sash, and stops are set true and straight. Sash rabbets and stops shall be clean and dry at time of glazing.

4. Do not proceed until unsatisfactory conditions have been corrected.

B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

A. Provide glass manufacturer's recommended edge clearances when sizing glass.

B. Remove protective coatings from surfaces to be glazed.

C. Clean glass and glazing surfaces to remove dust, oil, and contaminants, and wipe dry.

D. Verify measurements of sash and openings at Project.

1. Dimensions shown or indicated are given only as a guide for estimating purposes, and actual size shall be determined by measurement of the actual openings. Accurately cut glass to fit openings with proper clearances and setting block height.

E. Coordinate with and check Shop Drawings furnished by other suppliers of Work affecting this Section to avoid field installation problems.

F. Before glazing metal sash, remove oil, lacquer, or other material to which the compound will not readily adhere or which will tend to delaminate from metal and cause a leak through the glazing seal.

3.3 INSTALLATION

A. Comply with glass fabricators recommendations.

B. Except where curtain wall, window, entrance or glass manufacturer recommends otherwise, comply with Flat Glass Marketing Association (FGMA) Sealant Manual and FGMA Glazing Manual.

C. Glaze insulated units as recommended by glass and frame manufacturers.

D. Do not apply glazing materials at temperatures below manufacturer's recommendations or to damp or frosted surfaces. Apply glazing material according to the manufacturer's instructions using proper primers as required.

E. Set glass using neoprene setting blocks and spacers to insure proper edge clearance and uniform beads of compound. Clearances shall conform to FGMA Glazing Manual requirements. Center glass in glazing rabbets.

1. Butt glazing requirements: Apply mildew resistant silicone sealant to flush depth of joint as indicated by sealant manufacturer.

F. Check openings to confirm proper clearance at perimeters and between glass and stops.

1. Clean surfaces of rabbet (including stops) and surface of glass which will come into contact with sealant. Use solvents and methods which insure clean, dry surfaces without film or foreign material when sealant is placed.

G. Remove and replace glazing beads carefully to avoid marking or defacing any portion of frame, sash, or fastenings.

1. Set glass in full bed of glazing tape or sealant. Clean glazing material after stops are installed. Clean excess compound, etc. from glass after setting in conformance with glass manufacturer's recommendations.
2. If recommended prime surfaces prior to glazing.

H. Set glass with reams (waves) running horizontally. Set glass with factory attached labels in place.

I. Setting Blocks: Place setting blocks at locations recommended by glass manufacturer, generally between 1/4 points and 6 inches from corner, except at glazed doors.

1. At glazed doors, provide one block at sill, located 3 inches up from edge of glass at hinge side; one block at hinge side jamb, located 3 inches up from lower edge of glass; one block at head, located 3 inches from edge of glass at latch side of door; and, one block at jamb at lock side of door, located 3 inches down from edge of glass at top corner.
2. Use blocks of length required to properly support glass. Offset approximately 1 inch from shims.

J. Glass Installation in Steel (Hollow Metal) Frames:
   1. Glaze frames using pre-shimmed tape on both sides. Firmly glaze in place with joints sealed, free of rattles.
   2. Set glass on setting blocks with a full bed of sealant or glazing tape.

K. Glazing Sealant: Along entire bottom edge of light, and up at least 6 inches at each jamb, gun in continuous full bed of sealant to fill voids.
   1. Fill entire space, full width of pane, full depth of glass, with sufficient sealant to form heel along inside face and edge of glass.
   2. At other edges (top and sides) gun in continuous heel bead of sealant along edges of glass perimeter to set stop against and into, acting as fill between glass and stop.
   3. Immediately after setting glass, at entire perimeter of glass, gun in sealant between stop and glass so space above spacer is completely filled, without voids.
   4. Place sealant flush with daylight edge of stops, with slight watershed at exterior. Provide straight, smooth surface meeting at opening corners with sharp intersection.
   5. Leave no sealant on exposed surfaces of stops and glass.

L. Apply structural sealant carefully in uniform thickness pushing bead ahead of nozzle and making sure that entire cavity is filled. Air pockets or voids along edges are not acceptable.
   1. Tool joint immediately after application.
   2. Tool neatly, forcing sealant into contact with joint sides, eliminating internal voids and insuring good substrate contact.
   3. Do not tool with soap or detergent solutions.
   4. Install silicone structural butt glazing system in accordance with manufacturer's printed instructions.

M. Install plastic glazing according to manufacturer instructions.

N. Mirror installation: As indicated.
   1. Adhere mirrors to substrate with mirror mastic.

O. Apply self-adhering decorative film to clean glass surface according to manufacturer instructions.

3.4 CLEANING

A. Remove surplus materials.

B. Final cleaning of glass by Contractor.

END OF SECTION

SECTION 092400
PORTLAND CEMENT PLASTERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Stucco-Portland cement plaster patching including crack repair and infill.
   2. Metal lath, furring and accessories.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 061000 – Rough Carpentry.
   3. Section 079000 - Joint Protection.
   4. Section 099000 – Painting.

1.2 REFERENCES

A. ASTM C933: Standard Specification for Welded Wire Lath

B. ASTM A641: Specification for Zinc–Coated (Galvanized) Carbon Steel Wire

1.3 SUBMITTALS

A. Samples: Submit sample of cement plaster finish. Obtain sample acceptance before job site sample application.

B. Job Site Sample Areas: Make sample application of cement plaster work. Obtain acceptance of field sample before any additional application.

C. Accepted surface finish of sample establishes minimum standard of quality and workmanship of cement plaster work on job.

1.4 PRODUCT HANDLING

A. Except for sand and water, deliver materials to job site in sealed containers or bags. Store materials in dry, well-ventilated space, under cover and off ground.

1.5 ENVIRONMENTAL CONDITIONS

A. Provide sufficient heat and ventilation in areas where work of this Section is being performed, so as to allow cement plaster to properly cure. Take precautionary measures necessary to ensure that excessive temperature changes do not occur. Moist cure to prevent rapid dry-out.

PART 2 PRODUCTS

2.1 BASECOAT MATERIALS

A. Portland Cement: ASTM C150.

B. Hydrated Lime: ASTM C206, Type S.

C. Aggregate: ASTM C144 - basecoat gradation as follows:
   1. Aggregate: Colored, natural sand, marble dust or granite screenings graded as follows:

Sieve Size	Percent Passing
No. 4	100
No. 8	0 to 90
No. 16	60 to 90
No. 30	35 to 70
No. 50	10 to 30
No. 100	5

a. Not more than 50 percent shall be retained between 2 consecutive sieves nor more than 25 percent between No. 50 and No. 100 sieves.

D. Water: Potable.

E. Admixture: Acryl 60 by Thoro System Products.

F. Bonding Agent: ASTM C932, type recommended for satisfactorily bonding cement plaster to substrate. Plaster Weld by Larsen Products, Acryl 60 by Thoro System Products, Everbond by L & M Construction Chemicals or TK-225 by T.K. Products.

G. Glass Fibers: 1/2 inch chopped glass fiber strands, alkali resistant; Owens-Corning Cem-FIL.

2.2 FINISHING PLASTER MATERIALS

A. Premixed Finishing Coat: 100 percent acrylic finish with integral color by Dryvit Systems, Parex Insul/Crete, Senergy Incorporated, STO Industries or Thoro System Products. Standard (Custom) colors as selected.

B. Water: Potable.

C. Admixture: Acryl 60.

D. Colors and finishing: No integral color admixtures required. Refer to Section 099000 – Painting and Finish Schedule for exterior painting.

2.3 METAL ACCESSORIES

A. Corner Beads, Casing Beads and Base Screeds: Zinc alloy accessories of longest possible lengths; sized and profiled to suit application. Casing beads: Milcor #66 or equivalent Keene.

1. Soffit Drip: Extruded aluminum, profile as shown, continuous drip trim.

B. Expansion Joints: Back to back casing beads of longest possible lengths. Control joints and expansion joints: 2 Milcor #66 casing beads.

C. Anchorages: Nails, staples, or other metal supports, of type and size to suit application and to rigidly secure metal accessories in place.

D. Corner Reinforcing: Corner Aid galvanized reinforcing by Stockton Wire Products.

E. Metal Lath: Galvanized self-furring lath 3.4 lbs per square yard. Comply with FS QQ-L-101C and ASTM C847.

F. Metal Lath Alternate: Grid shaped, self-furred, welded wire lath, formed from cold rolled rectangular longitudinal wires with coated thickness dimensions of 0.0330 inch (0.83 mm) by 0.075 inch (1.90 mm), and round cross wires having a coated diameter of 0.056 inch (1.42 mm), resistance welded at the intersections. Galvanized coating complying with ASTM A641. Minimum nominal weight 1.95 pounds per square yard (1.05 kg/m^2).

1. Structa Wire Products Mega Lath or equal.

2.4 METAL LATH (ACCESSORIES)

A. Two-Ply Paper Backing for Expanded Metal Lathe: FS UU-B-790, Type I, Grade D, Style 2 vapor-permeable paper; with water-resistance rating not less than 110 minutes per ASTM D 779.

1. Product: Premier Fortifiber Two-Ply Jumbo Tex, by Fortifiber, or approved equal.
2. Physical and Performance Properties:
   a. Moisture Vapor Transmission: 35 grams minimum; ASTM F 1249.

2.5 CEMENT PLASTER MIXES

A. Apply minimum 7/8 inch thick (measured from face of lath). Mix and proportion cement plaster, parts by volume, as follows:

1. Scratch Coat: One Portland Cement, 3/4 lime, 2-1/2 - 4 aggregate, one admixture to 3 water.
2. Brown Coat: One Portland Cement, 3/4 lime, 3-5 aggregate, one admixture to 3 water, 2 percent glass fibers.
3. Premixed Finishing Coat: In accordance with manufacturer's recommendations.

4. Mixing Liquid: One part admixture to 3 parts water.

B. Mix only as much plaster as can be used in one hour.

C. Mix materials dry, to uniform color and consistency, before adding water.

D. Protect mixes from frost, dust and evaporation.

E. Do not retemper mixes after initial set has occurred.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces which are to receive cement plaster and accessories, and conditions under which work is to be performed. Do not proceed with cement plaster work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prior to application ensure mechanical and electrical services behind surfaces to receive cement plaster have been tested and approved.

B. Clean surfaces of dust, laitance, efflorescence, loose particles, grease or other foreign matter. Thoroughly wet surfaces before using acid solutions, solvents or detergents to perform cleaning. Thoroughly wash surfaces with clean water immediately following their use. Ensure mortar joints are flush. Do not use acid solutions without approval of Architect.

C. Roughen smooth so as to allow adequate adhesion. Use method acceptable to Architect.

D. Apply bonding agent on surfaces which are to receive cement plaster. Apply in accordance with manufacturer's recommendations, ensuring complete coverage.

E. Ensure metal lath has been properly installed and rigidly secured.

F. Wet surfaces to reduce excessive suction.

G. Place metal accessories true to lines and levels.

3.3 LATHING

A. Install metal lath where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced ML/SFA specifications and ASTM lathing installation standards.

3.4 PLASTERING

A. Apply cement plaster using 3 coat system.

B. Apply scratch and brown coats minimum thickness of 3/8 inch each coat. Apply with sufficient pressure to form good bond with masonry and to force through and completely imbed metal lath. Horizontally scratch first coat.

C. Maintain surface flatness, with maximum variation of 1/8 inch in 10 feet for plumb and level tolerances.

D. Construct control joints at maximum 10 foot centers as indicated or as directed by Architect to divide areas into panels not exceeding 100 sq ft in area.

E. Moist cure basecoat.

F. Apply finish coat in accordance with manufacturers instructions. Apply finish continuously in one operation to entire area maintaining "wet" edge so that completed finish is free of scaffold lines and other imperfections due to application methods.

G. Avoid excessive working of surface. Delay trowelling as long as possible to avoid drawing excess fines to surface.

3.5 CRACK REPAIR

A. Examine and assess condition and type of cracks. Determine condition of bond between cracked plaster and substrate.

B. Clean out cracks larger than approximately 1/8 inch using scraping tools to open crack width, remove loose or damaged plaster in cracks and to reveal binding substrate if plaster below surface is loose or damaged. Clean out loose and damaged plaster through to bonding substrate and remove bonding keys that have failed. Clean and open cracks to sufficient width to receive new two-coat plaster infill and finish to match.

C. Re-secure solid plaster around crack areas to bonding substrate where plaster is intact but pulled away from substrate.
   1. Secure loose plaster on either side of loose area and crack with minimum 1-1/2 – 2 inch stainless steel plaster screws and washers approximately 2 inches from the crack and secure to solid substrate and framing beneath, with screw heads counter-sunk below finished plane of plaster.

D. Apply a two-coat plaster fill into cracks.
   1. Base-coat shall re-establish bond to key-way and consist of a lime-based plaster with sand or silicate based aggregate.
   2. Finish coat shall be creamy plaster finish coat with sand admixture to match finish of existing surrounding plaster.
   3. Application:
      a. Mist cracks lightly with water spray without over-saturating substrate.
      b. Squeeze base coat into cracks and force into keying with substrate and roughly smooth over crack with sufficient depth remaining to receive finish coat. Allow to cure for a minimum of 24 hours.
      c. Apply finish coat evenly over cured base coat with finish plaster mix. Spray lightly with water as needed and smooth or float to finish and blend, matching to existing surfaces.
      d. Hair-line cracks" Spread finish coat plaster over and into small hair-line cracks. Smooth over and feather to match surrounding existing plaster.

END OF SECTION

SECTION 092900
GYPSUM BOARD

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Mold resistant gypsum board.
   3. Board accessories, corner reinforcement, casing beads, control joints.
   4. Fasteners, screws and adhesive, wallboard sealant.
   5. Gypsum board treatment of joints, corners, metal trim flanges and fasteners.
   6. Acoustical insulation, sealant and installation requirements for acoustical gypsum board systems.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 061000 - Rough Carpentry: Wood framing and blocking.
   3. Section 099000 - Painting.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For accessories exposed to view in final installation.
   1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.3 QUALITY ASSURANCE

A. Pre-installation Conference: Convene a pre-installation meeting at the beginning of the project to review acoustically rated construction requirements and to coordinate penetrations.
   1. Architect, Contractor, Owner's representative and each trade that may need to penetrate acoustically rated construction or will be involved in construction of acoustically rated partitions and related systems must attend.
   2. Review layouts and routing for potential penetrating items, discuss reducing or eliminating penetrating items by considering alternate routing, review construction requirements, details and specifications for acoustically rated construction.
   3. A follow-up meeting should be scheduled as needed.
   4. his meeting can occur in conjunction with a regular construction progress meeting.
   5. Publish meeting minutes highlighting topics discussed, actions items and decision made.

B. Mockups: Before beginning gypsum board installation scheduled to receive Level 4 Finish, install panel mockup, 48 inches wide by 96 inches tall, demonstrating at least 2 vertical and 2 horizontal joints, for Architects review of aesthetic effects workmanship.
   1. Apply or install final finish indicated, including painting, on exposed surfaces for review of mockups.
   2. Simulate finished lighting conditions for review of mockups.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage.
   1. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum board.
   1. Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F maintain continuous, uniform, comfortable building working temperatures of not less than 55 degrees F for minimum period of 48 hours prior to, during and following application of gypsum board and joint treatment materials or bonding of adhesives.
   2. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

B. Damaged Materials: Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory." GA-600, "Fire Resistance Design Manual."

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
   1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

2.2 GYPSUM PANEL PRODUCTS

A. Gypsum board products not containing asbestos.

B. Provide gypsum panel materials in accordance with recommendations of GA 216.

C. Size: Unless indicated otherwise, provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

D. (GYP BD) Gypsum Wallboard:
   1. Acceptable Manufacturer's:
      a. United States Gypsum.
      b. National Gypsum Company.
      c. Georgia-Pacific.
      d. CertainTeed Corporation.
      e. Temple-Inland.
   2. Gypsum Wall Board: ASTM C1396
      a. (GYP BD-1) Standard Board: Type "X", 5/8 inch thickness.
         1) Provide mold and water-resistant gypsum board as required by local building code and as indicated.
         2) (GYP BD-2) Fire-rated Board: Type "X", 5/8 inch thickness.
         3) Provide mold and water-resistant gypsum board as required by local building code and as indicated.

2.3 MOISTURE AND MOLD RESISTANT GYPSUM BOARD

A. (GYP BD-37) Moisture-and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces. ASTM D3273 score of 10.
   1. Core: 5/8 inch, Type X.
   2. Long Edges: Tapered.
   3. Acceptable manufacturers and product for paper faced moisture and mold resistant type: ASTM C1396.
      a. CertainTeed Corp.: M2Tech Type X Gypsum Board.
      b. G-P Gypsum: ToughRock Mold-Guard Fireguard X.
      c. National Gypsum Company: Gold Bond Brand XP Fire-Shield Gypsum Board.
      d. United States Gypsum Co.: SHEETROCK Brand Mold Tough Firecode Gypsum

2.4 INSULATION

A. Insulation is required to be formaldehyde-free or GreenGuard Indoor Air Quality Certified.

B. (INSUL-40) Acoustical Insulation- Fiberglass Batts: As required to meet requirements of UL Design, one of following materials: Man made vitreous fiber or resilient glass fibers bonded with thermo-setting resin. with maximum flame-spread and smoke-developed indices of 25 and 50 per ASTM E 84, respectively; passing ASTM E 136 for combustion characteristics.
   1. Thickness: Same as stud depth or as indicated.
   2. Width of Batts: As required to meet UL requirements.
   3. ASTM C665, Type 1 (Unfaced).
   4. Manufacturers and Product:
      a. Johns Manville: Formaldehyde-Free and Unfaced Sound Control Batts.
      b. Owens Corning: Fiberglas Sound Attenuation Batts.
      c. Certainteed: CertaPro AcoustaTherm Batts.
      d. Thermafiber: Sound Attenuation Fire Blankets (SAFB).

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Corner Trim, Edge Trim, Inside Corner Trim for Abuse Resistant Gypsum Board:
   1. Provide fully bonded paper faced and joint tape backed copolymer tapered plastic trim at abuse resistant gypsum board.
   2. Provide corner trim as recommended by manufacturer for each condition.
   3. Manufacturer:
      a. Drywall Systems International No-Coat.

C. Joint Tape:
   1. Interior Gypsum Wallboard: Paper.
   2. Tile Backing Panels: As recommended by panel manufacturer.

D. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: For second coat, use drying-type, all-purpose compound.
   4. Finish Coat: For third coat, use drying-type, all-purpose compound.
   5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound, or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat compound to produce Level 5 finish.

E. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping and setting-type, sandable topping compounds.
2. Glass-Mat Gypsum Sheathing Board: As recommended by manufacturer.

2.6 ACOUSTICAL SEALANT

A. Products: Provide one of the following unless otherwise required to meet requirements of referenced STC rating. Provide low emitting sealants meeting SCQAMD rules.

B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 and ASTM C 919 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
   1. Pecora AC-20 FTR Acoustical and Insulation Sealant.
   2. United States Gypsum Co. SHEETROCK Acoustical Sealant.
   3. Hilti Incorporated CP 506 Acoustical Sealant

C. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
   1. Ohio Sealants, Inc. Pro-Series SC-170 Rubber Base Sound Sealant.
   2. Pecora Corp. BA-98.
   3. Tremco, Inc. Tremco Acoustical Sealant.

D. Provide moldable putty type products acceptable to meet or exceed STC rating at service boxes.

2.7 ACCESSORIES

A. Fasteners and Anchorages: GA 216, USG Brand screws, type and size as recommended by wallboard manufacturer.

B. Trim Accessories:
   1. USG: Dur-A-Bead and Perf-A-Tape corner reinforcement.
   2. USG #200-A "J" metal trim.
   3. USG #200-B "L" metal trim.

C. Control Joints
   1. (GYP TRIM-1): Dietrich Zinc Control Joint No. 093

D. Joint Treatment: USG Perf-A-Tape joint system.

E. Metal Reveals and Trim: Large scale, extruded aluminum wall and ceiling trim profile as indicated.
   1. Manufacturers:
      a. Gordon Incorporated
      b. Fry Reglet.
   2. (GYP TRIM-3) Profile: As shown on Material Identification Codes.
   3. (WRT-1) Profile: As shown on Material Identification Codes.

F. Adhesive: USG Durabond, as recommended by wallboard manufacturer for wood framing.

G. Laminating Adhesive: Joint compound or adhesive as recommended by wallboard manufacturer for laminating gypsum board face layer to gypsum board base layer.

H. Joint Sealant: As specified in Section 079000 - Joint Protection.

PART 3 EXECUTION

3.1 GYPSUM BOARD INSTALLATION

A. Install and finish gypsum board and accessories in accordance with manufacturer's printed instructions and comply with recommendations of GA 216 and ASTM C840, including appendixes. Verify control joint locations at walls and ceilings with Architect.

B. Minimize butt joints by using gypsum board of maximum length possible. If cut butt joints are unavoidable, locate end butt joints as far from center of walls or ceilings as possible and stagger not less than 12 inches in alternate courses of board.

C. Do not install imperfect, damaged, damp or wet gypsum board.

D. Butt boards together for light contact at edges or ends with not more than 1/16 inch open space between boards. Do not force into place.

E. Locate edges and joints over supports or back-blocking except in horizontal applications. Position gypsum board so that both tapered edge joints and cut edges abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partition/walls.
   1. Form curved surfaces by carefully bending and fastening board to smooth even curve, free of flat or distorted areas and other imperfections. Comply with manufacturer's instructions for dampening of sheets or scoring of back face, if required to form to radius shown.
   2. Hold gypsum board 1/4 inch above floor at each type of partition.

F. Install solid and semisolid drywall partitions made-up of coreboard or gypsum board studs with face courses of exposed gypsum board, laminated with both adhesive and screws.

G. Isolate gypsum surfaces with control joints or other stress relief where:
   1. Partition or furring abuts structural element (except floor) or dissimilar wall or ceiling.
   2. Ceiling abuts structural element, dissimilar wall or partition or other vertical penetration.
   3. Construction changes within plane of partition or ceiling.
   4. Partition or furring run exceeds 30 feet.
   5. Ceiling dimensions exceed 30 feet in either direction.
   6. Wings of "L", "U" and "T" shaped ceiling areas are joined.
   7. Expansion joints occur in exterior wall if expansion joints are not used.
   8. Where control joint is near a door opening, locate and align control joint with edge of door frame.
      a. Ceiling height door frames may be used as control joints.
      b. Where door frames are less than ceiling height, extend control joints to ceiling from both corners
   9. Review location of joints with Architect.

H. Cover both faces of stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

I. Provide perimeter isolation where non-load-bearing partitions abut structural decks or ceilings, or vertical structural elements. Allow not less than 1/4 inch, or more than 1/2 inch gap between gypsum and structure. Finish edges of face layer with casing bead. Seal space between casing bead and structure with continuous acoustical sealant bead. Do not attach board directly to tracks.

J. Cutting, Fitting and Trimming: Accurately measure and precut gypsum drywall units prior to installation. Make cuts from face side by scoring and snapping away from face side or by sawing. Completely cut paper on back face; do not break paper by tearing. Maintain close tolerances for accurate fit at joints between sheets and at framed openings, and allow for covering of edges of cut-outs with plates and escutcheons. Cut edges smooth as required for neat and accurate fit.

K. Begin fastening from center portion of sheet and work toward edges and ends. Ensure contact of drywall with supports by applying pressure on surface adjacent to fastener being driven. Do not locate fasteners closer than 3/8 inch from edges or ends of sheets. Drive with shank approximately perpendicular to drywall surface.

L. Drive screws with power screwdriver recommended by drywall manufacturer. Do not hammer drive screws. Set screw heads slightly below surface of drywall, but do not break or strip paper face around screw. Stagger screws on edges and ends of adjacent sheets.

M. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

1. Z-Furring Members: Apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

N. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.2 ACCESSORIES INSTALLATION

A. Acoustical Insulation: Install blankets in accordance with manufacturer's printed instructions, with tight joints in blanket units. Use tape, adhesive or staples to hold blankets in place.

1. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions and tight to items passing through partitions.

B. Drywall Sealant: Seal perimeter of sound-rated partitions by filling open space between drywall and floor or ceiling construction with continuous bead of sealant. Fill open spaces between drywall and fixtures, cabinets and other flush or penetrating items with continuous bead of sealant. Seal sides and back of electrical boxes to completely close up openings and joints. Seal perimeter of wallboard shaft wall where it abuts other work.

1. Apply joint sealant in accordance with Section 079000 - Joint Protection.

C. Adhesive Application: Use adhesive recommended by manufacturer for type of substrate indicated. Prepare substrate and laminate wallboard in accordance with manufacturer's printed instructions. Provide temporary fasteners or bracing as recommended until adhesive sets.

D. Reinforce external corners of drywall with metal corner bead. Securely fasten metal corner beads, edge trim casing beads and control joints.

3.3 FINISHING

A. Finish exposed drywall surfaces with joints, corners and exposed edges reinforced or trimmed and with joints, fastener heads, trim accessory flanges and surface defects filled with joint compound in accordance with drywall manufacturer's recommendations for smooth, flush surface. Form true, level or plumb lines, without joints, fastener heads, flanges of trim accessories or defects visible after application of field-applied decoration. Exposed metal trim (not filled) will not be acceptable.

B. Use joint tape to reinforce joints formed by tapered edges or butt ends of drywall units and at interior corners and angles. Set tape in joint compound and apply skim coat over tape in one application. Do not use topping or finishing compounds for setting of tapes.

C. Apply joint compound to joint. Apply joint compound to fill holes left from removal of screws at intermediate studs. Finish gypsum drywall thereafter, including sanding of final coat, in accordance with ASTM C840.

D. Where open spaces of more than 1/16 inch width occur between abutting drywall units, except at control joints, prefill joints with joint compound and allow prefill to dry before application of joint tape.

E. Finish Levels of Joints in Interior Gypsum Board Work:

1. Level 0: No taping, finishing, or accessories required.
   a. Use above suspended ceilings and within other concealed spaces, unless assembly is fire rated, sound rated, sound or smoke controlled, or unless space serves as air plenum.

2. Level 1: At joints and interior angles embed tape in joint compound. Leave surface free of excess joint compound. Tool marks and ridges are acceptable.
3. Level 2: At joints and interior angles embed tape in joint compound with one separate coat of joint compound applied over joints, angles, fastener heads, and accessories.
   a. Use for mold and water resistant gypsum board indicated for use as a substrate for ceramic tile.
   b. Use for gypsum board indicated for use as a substrate for wood paneling or acoustical panels.
   c. Use above suspended ceilings and within other concealed spaces if gypsum board assembly is fire rated, sound rated, sound or smoke controlled, or space serves as air plenum.
4. Level 3: At joints and interior angles embed tape in joint compound with 2 separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges.
   a. Use where heavy grade wall covering is final decoration.
   b. Use where gypsum board is base for acoustical ceiling tile.
5. Level 4: At joints and interior angles embed tape in joint compound with 3 separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges.
   a. Use for all locations, except those indicated for other finish levels.

3.4 CLEANING

A. Recover clean cut-off gypsum construction waste for subsequent processing in preparation for reuse. Coordinate and comply with construction waste recycling plan specified in Section 017420.

3.5 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 093000
TILING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Quarry tile flooring and base.
   2. Portland cement mortar and grout, dry-set mortar, organic adhesive, latex- cement mortar and grout.
   3. Transition thresholds in door openings.
   4. Waterproofing membrane system for tile applications.
   5. Sealant and backer materials in tile work.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 033000 - Cast-in-Place Concrete: Concrete subfloors.
   3. Section 079000 - Joint Protection: Other sealants.
   4. Section 102813 - Toilet Accessories.

1.2 REFERENCES

A. ANSI A108.1 - Ceramic Tile Installed with Portland Cement Mortar.

B. ANSI A108.6 - Ceramic Tile Installed with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.

C. ANSI A108.7 - Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar.

D. ANSI A108.10 - Installation of Grout in Tile Work.

E. ANSI A118.4 - Latex-Portland Cement Mortar.

F. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.

G. ANSI A137.l - Specifications for Ceramic Tile.

H. Tile Council of North America - Handbook for Ceramic Tile Installation.

I. MMSA - Materials and Methods Standards Association.

1.3 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 010000. Indicate tile patterns and locations; width and locations of control, isolation, contraction and expansion joints in tile surfaces.

B. Samples: Submit in accordance with Section 010000, for color selection and appearance acceptance.

1.4 QUALITY ASSURANCE

A. Standards: Comply with applicable reference standards unless otherwise indicated.

B. Manufacturing Standards: Provide tile to comply with Standard Grade Requirements of ANSI A137.1.

C. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

D. Installer Qualifications: Engage experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with record of successful in-service performance.

1.5 PRODUCT HANDLING

A. Deliver, store and handle tile, mortar, and grout materials with care to avoid damage.

1.6 ENVIRONMENTAL CONDITIONS

A. Provide sufficient heat and ventilation in areas where work of this section is being performed, so as to allow ceramic tile to properly set. Take precautionary measures necessary to ensure that excessive temperature changes do not occur.

1.7 EXTRA MATERIALS

A. Replacement Materials: Upon completion of work deliver extra tile to Owner for total of one percent of tile used of same size and color for use in future repair and maintenance work.

PART 2 PRODUCTS

2.1 TILE MATERIALS

A. (QT-1) and (QTB-1) Quarry Tile: ANSI A137.1.
   1. Refer to Finish Legend on Drawings.

2.2 CERAMIC TILE ACCESSORIES

A. Quarry Tile Cleaner: Hillyard's Renovator or approved equal.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

B. (TRS-1) Resilient to Quarry Tile Type: Refer to Finish Legend on Drawings.

2.4 MORTAR MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
   1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
   2. Prepackaged dry-mortar mix combined with styrene-butadiene-rubber liquid-latex additive.
      a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

2.5 GROUT MATERIALS

A. Cement Grout materials:
   1. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
   2. Standard Sanded Cement Grout: ANSI A118.6, color as indicated.
   3. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.

B. Acceptable Cement Grouts Manufacturers:
   1. Bonsal, W. R., Company.
   2. Bostik Inc.
   3. Custom Building Products.
   4. DAP, Inc.
   5. LATICRETE International Inc.
   6. MAPEI Corporation.
   7. TEC Specialty Products Inc.

2.6 WATERPROOFING AND CRACK ISOLATION

A. Fluid-Applied Waterproofing System: Provide continuous and seamless waterproofing and crack isolation system, including premixed or single-component self-curing liquid-latex rubber or elastomeric-polymer membrane; ANSI A118.10 and ANSI 118.12; ASTM C627 Extra Heavy Service rating; IAPMO-approved as shower pan liner; and recommended by the manufacturer for the application indicated.

1. Products and Manufacturers:
   a. Redgard Waterproofing and Crack Prevention Membrane by Custom Building Products
   b. Hydro Ban by Laticrete International, Inc..
   c. Mapelastic AquaDefense by Mapei Corporation.
2. Pre-treat control joints and cracks in accordance with membrane manufacturer's instructions.
3. Provide reinforcement and accessories as recommended by manufacturer for complete system.

2.7 MISCELLANEOUS MATERIALS

A. Horizontal Joint Sealant: One-part, non-sag, urethane conforming to FS TT-S-00230C, Type II, Class A.

1. Color to match adjacent grout.

B. Joint Filler or Bond Breaker (under sealant): As specified in Section 079000 - Joint Protection.

C. Reinforcing Mesh: Minimum 16 gauge galvanized wire mesh; 2 inch by 2 inch size.

2.8 MIXING

A. Mix and proportion cementitious materials for site made leveling coats, mortar beds and bond coats and grout as recommended by Handbook for Ceramic Tile Installation.

B. Mix and proportion premix setting bed bond coat and grout materials in accordance with manufacturer's recommendations.

C. Setting Beds:

1. Dry-set cement mortar on wood float finished Portland cement plaster, concrete and masonry walls, and concrete floors.
2. Organic adhesive on smooth plaster or gypsum wallboard walls.
3. Cement mortar and membrane waterproofing in shower base.
4. Latex-cement mortar and latex-cement grout in shower areas, and as indicated.
5. Flexible latex-cement mortar at tile.
6. At Tile Backer Board: As recommended by backer board manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard.

B. Prior to installing tile work, ensure that surfaces are level, with maximum surface variation of 1/8 inch in 10 feet and sloped to drains.

C. Prior to installing tile work, coordinate with other trades layout of expansion joints in tile work to ensure expansion joints in substrate and tile work line up.

3.2 PREPARATION

A. Prepare surfaces to receive tile as recommended by mortar or adhesive manufacturer.

1. Roughen surfaces that are glossy or which have loose surface material by sanding or scarifying.
2. Remove surface material that is not compatible with adhesive.
3. Use primer when recommended by adhesive manufacturer.

4. Clean thoroughly to remove oil, dirt and dust.
5. Embed reinforcing in setting bed where indicated.

3.3 TILE INSTALLATION

A. Install tile work in accordance with applicable parts of ANSI A108 and manufacturer's printed instructions. Comply with TCNA installation methods as applicable to installation conditions.
   1. Achieve 100 percent bond in tile work. Back butter units 8 inch by 8 inch and larger.

B. Extend tile work into recesses and under equipment and fixtures, to form complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Grind cut edges of tile abutting trim, finish or built-in items for straight, aligned joints.
   1. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars or covers overlap tile.

D. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated, or if not indicated, at spacings and locations recommended in TCNA Handbook for Ceramic Tile Installation, and approved by Architect.

E. Jointing Pattern: Unless otherwise shown, lay ceramic tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields both directions in each space or on each wall area.
   1. Adjust to minimize tile cutting. Provide uniform joint width.

F. At quarry tile, mix tile prior to installation to provide uniformly dispersed color blending.
   1. Provide 3/8 inch wide joints.
   2. Unless otherwise indicated, lay quarry tile with end joints centered on tile in adjacent rows in one direction and straight in-line joints in other direction.

G. Apply grout sealer as recommended by sealer and grout material manufacturers.

3.4 MEMBRANE WATERPROOFING

A. Preparation: Concrete surfaces to be waterproofed shall be clean and free from loose scale, mortar and structural cracks.

B. Surface preparation and temperature limitations shall be as recommended by membrane manufacturer. Pre-treat substrate cracks and joints as recommended.

C. Spray apply membrane waterproofing according to manufacturer instructions, in 2 coat application, with combined dry coat thickness of 0.030 inch (0.8 mm).

D. Apply two separate layers. Apply first layer to cover base floor substrate below mortar bed continuous from drain and covering entire wall surface to ceiling on each wall. Second layer is applied over the mortar bed and is continuous overlapping into drain and extending 2 feet above water line onto vertical wall surface.

E. Install at each drain and behind tile at each wet location. Extend waterproofing onto entire wall surface up to ceiling. Include ceiling if recommended by TCA and GA guides.

3.5 SEALANT AND BACKER

A. Sealant Installation: Install sealant as recommended by manufacturer.
   1. Install sealant at joint between showers, tub, floor-mounted fixtures, cabinets, and tile and other locations where noted on Drawings.
   2. Install sealant at corners of tile to tile at bath and shower recesses.

3.6 FIELD QUALITY CONTROL

A. Upon completion of membrane waterproofing work and prior to tile installation, plug drain or dam areas and fill with water. After 24 hours, inspect for leakage. Make necessary adjustments to stop leakage and re-test until watertight.

3.7 ADJUST AND CLEAN

A. Clean grout and setting materials from face of tile while materials are workable. Leave tile face clean and free of foreign matter.

B. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not sooner than 10 days after installation.

C. Thoroughly soak quarry tile prior to cleaning. Clean with non-acid solution that will not discolor colored grout joints. Immediately scrub with equal parts cleaner and water.

D. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

E. Protect installed tile work with non-staining Kraft paper over 3/4" thick plywood or OSB protection board as called for in the TCNA Handbook for Ceramic Tile Installation to prevent damage and wear during construction period.

END OF SECTION

SECTION 096500
RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Vinyl flooring and rubber base.
   2. Resilient flooring accessories.
   3. Cleaning and waxing of resilient flooring.
   4. Resilient flooring in elevators.
   5. Transition strips

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 033000 - Cast-in-Place Concrete: Finish floor slab and moisture treatment.
   3. Section 144200 – Wheelchair Lifts.

1.2 SUBMITTALS

A. Shop Drawings: Submit layout drawings on sheet flooring showing flooring pattern, seam locations, pattern direction, and type of edge treatment. Provide detail as needed to show edge finishing and butting of materials that do not receive transitioon strips where noted on the Drawings.

B. Slab Moisture Content and Calcium Chloride Test Results: Submit to Architect.

C. Samples: Submit samples of tile and sheet flooring in accordance with Section 010000.

D. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring.

1.3 QUALITY ASSURANCE

A. Provide each type of resilient flooring produced by single manufacturer, single run.

B. Applicator Qualifications: Installation of resilient flooring shall be by manufacturer's approved applicator.

C. Conductive Sheet Flooring: Representative of flooring manufacturer shall be at site during sheet flooring installation.

D. Job Mock-Up: Make sample installation of vinyl base on project surfaces as directed by Architect. Obtain acceptance of sample field installation and accomplish work to equal or exceed standard established by accepted sample.

1.4 PRODUCT HANDLING

A. Deliver resilient flooring materials in manufacturer's protective packaging. Store and handle flooring with care to prevent damage.

1.5 PROJECT CONDITIONS

A. Maintain temperature in areas of installation as recommended by resilient flooring manufacturer.

1.6 EXTRA MATERIAL

A. Replacement Materials: Deliver not less than one percent of total project quantity of each type, size and color of material to Owner for replacement materials.

B. Clearly identify each container as replacement materials.

PART 2 PRODUCTS

2.1 FLOOR COVERING MATERIALS

A. Slip Resistance of Flooring Materials: Provide materials with 0.6 coefficient of friction or greater when tested in accordance with ASTM 2047.

B. (RF-1), (RF-2), (RF-3) Resilient Flooring: Refer to Finish Legend on Drawings.

2.2 RESILIENT FLOORING ACCESSORIES

A. (RB-1) Rubber Base: ASTM F1861, Refer to Finish Legend on Drawings.

B. (ST-1) Resilient Stair Treads: ASTM F2169, Refer to Finish Legend on Drawings.

C. Transition Strips: Provide at edges of resilient flooring wherever edge is exposed or transitions to another material.

1. (TRS-1) Resilient to Quarry Tile: Refer to Finish Legend on Drawings
2. (TRS-2) Resilient to Resilient: Refer to Finish Legend on Drawings
3. (TRS-3) Resilient to Resilient: Refer to Finish Legend on Drawings.

2.3 FILLERS/ADHESIVES/SEALERS

A. Sub-Floor Filler: White premix latex, mix with water to produce cementitious paste.

B. Primers and Adhesives: Water-resistant stabilized type as recommended by resilient flooring manufacturer for specific material.

C. Flooring Adhesives: Adhesive recommended and approved by flooring manufacturer, zero VOC, tested by the adhesive manufacturer for use with the specified flooring product; Submit approval documentation by both flooring manufacturer and adhesive manufacturer as compatible with substrate, flooring, project conditions, use, expected traffic, equipment loads and surface conditions including alkalinity, moisture emission levels, slab relative humidity, and other factors that may affect flooring and adhesive performance.

D. Cove/Base Adhesives: Adhesive recommended and approved by base manufacturer, zero VOC, tested by the adhesive manufacturer for use with the specified/approved base product.

1. Submit approval documentation by both base manufacturer and adhesive manufacturer as compatible and appropriate for noted use.
2. Adhesive shall be of superior bond strength and impact/tamper resistant.
3. Adhesive Manufacturers and Products:
   a. Basis of Design; Mapei Ultrabond ECO575.
   b. Other acceptable products as submitted and approved by Architect.

E. Adhesive and Sealant VOC Limits: According to South Coast Air Quality Management District Rule 1168 and GS-36 for aerosols. VOC Limits: As tested using U.S. EPA Reference Test Method 24 and as defined by South Coast Air Quality Management District Rules: SCAQMD Rule 1168, Adhesive and Sealant Applications

F. Polish: Type recommended by resilient flooring material manufacturer for material type and location.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which resilient flooring is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 SITE AND SUBSTRATE CONDITIONS

A. Ensure floor surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet.

B. Ensure concrete floors are dry and meet moisture conditions required by flooring and adhesive manufacturer's and exhibit negative alkalinity, carbonization or dusting. Also ensure substrate meets requirements of adhesive and flooring manufacturer's requirements. Remove curing agents and other surface residue that may negatively affect adhesion or flooring installation and performance.

C. Floor Substrate Criteria:
   1. Moisture vapor emissions do not exceed 75 percent RH when tested in accordance with ASTM F2170 unless otherwise required by finished flooring and adhesive manufacturer.
   2. Moisture in concrete slab conditions up to 3lb. per 1,000 sq. ft. per 24 hours when tested with a prepackaged calcium chloride crystal kit performed in accordance with ASTM F1869 unless otherwise required by finished flooring and adhesive manufacturer.
   3. Concrete slab alkalinity conditions up to a pH of 6-9 when tested in accordance with ASTM F710 with in-situ monitoring, unless otherwise required by finished flooring and adhesive manufacturer.
   4. Maintain testing records and submit along with warranties for Project Record Documents.

D. Maintain minimum 70 degrees F air temperature at flooring installation area for 3 days prior to, during, and for 24 hours after installation.

E. Store flooring materials in area of application. Allow 3 days for material to reach equal temperature as area.

3.3 LEVELING

A. Preparation: Prepare substrate surfaces to receive resilient flooring as recommended by adhesive manufacturer and resilient flooring manufacturer.
   1. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.
   2. Clean floor and apply, trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler is cured.

3.4 INSTALLATION - FLOORING

A. Install flooring and accessories in accordance with referenced standards and manufacturer's written instructions.

B. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged. Lay tile with grain in tile running in same direction, unless otherwise shown.

C. Clean substrate. Spread adhesive evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of flooring before initial set.

D. Set flooring in place; press with heavy roller to ensure full adhesion. Tightly adhere flooring to substrate without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.

E. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams and symmetrical tile pattern as indicated.

F. Lay tile from center marks established with principal walls, discounting minor offsets, so tile at opposite edges of room are of equal width. Install with minimum tile width 1/2 full size at room or area perimeter, to square grid pattern with joints aligned unless otherwise indicated.

G. Transitions between adjoining flooring materials without transition strips or trim: Install materials to finish in the same horizontal plane smoothly and without difference between butting edges, and butt adjoining materials close and precise to a hairline joint.

H. Install sheet flooring to minimum of 1/3 full material width and with sheet parallel to length of room unless otherwise indicated. Lay sheet flooring to provide as few seams as possible. Double cut sheet and continuously heat seal or heat weld seams in vinyl sheet flooring to provide seamless installation. Match seam edges for color shading and pattern.

I. Install conductive sheet flooring in accordance with manufacturer's recommendations. Construct monolithic seamless floor by routing joints and interior welding and fusion of vinyl welding rods to each tile at joints. Authorized installers shall use only those procedures and materials as recommended and approved by flooring manufacturer.

J. Terminate resilient flooring at centerline of door openings where adjacent floor finish is dissimilar.

K. Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints. Cut flooring neatly to and around fixtures.

L. Install flooring wall to wall. Install under mobile or modular cabinets, and other items to produce wall to wall floor in all rooms.

M. Butt flooring tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce joints, laid tight, even, and straight. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

N. Install flooring on covers for telephone and electrical ducts, in pan type floor access covers, and other such items as occur within finished floor areas. Maintain overall continuity of color and pattern with pieces installed in these covers.

O. Continue flooring through areas to receive moveable type partitions without interrupting floor pattern.

P. Install feature strips and floor markings where indicated. Fit joints tightly.

3.5 INSTALLATION - ACCESSORIES

A. Apply wall base to walls, columns, pilasters, cabinetwork and other permanent fixtures in rooms or areas where base is required. Coped inside corners; install preformed outside corners. Tightly bond base to backing and fit joints tight and vertical.

B. Install base on solid backing. Adhere tightly to wall and floor surfaces throughout length of each piece, with continuous contact at horizontal and vertical surfaces. Scribe and fit to door frames and other obstructions.

C. Place transition strips tightly butted to flooring and secure with adhesive. Install edge strips at unprotected edges of flooring and at door jambs between rooms with different material, color or pattern of flooring.

D. Install resilient stair treads in accordance with manufacturer's printed instructions, in one piece for full width of tread.

E. Adhere accessories over each entire surface and fit accurately and securely.

3.6 PROTECTION

A. Prohibit traffic from floor finish for 48 hours after installation. Protect flooring from damage by use of protective covering.

3.7 CLEAN-UP

A. Remove excess adhesive or other surface blemishes from floor, base and wall surfaces without damage, and as recommended by flooring manufacturer.

3.8 FINISHING

A. After completion of project and just prior to final inspection of work, thoroughly clean floors and accessories. Apply sealer, wax and buff, with type of sealer, wax, number of coats and buffing procedures as recommended by flooring manufacturer for new flooring installation. Seal and wax floor and base surfaces in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 099000
PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Painting and finishing of new materials.
   2. Preparation of surfaces for painting and finishing.
   3. Repainting and refinishing of existing surfaces as indicated and as specified in Section 010000.
      a. Preparation of existing surfaces for repainting and refinishing.
   4. Smoke and fire partitions stenciling, and pipe painting.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 064000 – Finished Wood Carpentry.
   3. Section 081400 – Wood Doors.
   4. Section 092900 - Gypsum Board.

1.2 SUBMITTALS

A. Product Data: For each paint system specified. Include fillers and primers.
   1. Material List: Provide inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
   2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing and applying each coating material proposed for use.
   3. Certification by manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples: Submit paint and transparent finish samples in accordance with Section 010000, for color selection and finish acceptance.
   1. Paint Colors, Surface Treatments and Finishes: As selected by Architect. Submit three 8 inch by 10 inch samples to be reviewed for color and sheen. Architect reserves right to select color or finish from any manufacturer, herein specified, as necessary to achieve desired color or finish.

C. Mock-Up for Stain Coatings:
   1. Job Site Sample Areas: Make sample application of Stain coatings on exterior unpainted wood project surfaces to the extent of one system on an on – site sample board that has actual samples of each substrate product proposed and accepted for work to be put in place as directed by Architect.
      a. Obtain acceptance of sample field application before making additional applications.
      b. Accomplish work to equal or exceed standards established by approved samples. Protect and maintain approved field samples through completion of project.

D. Schedule: For acceptance, submit 3 copies of complete schedule showing each product by number and brand name proposed to be used at each surface and location. Generally follow specified outline and list number of coats.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide primers and undercoat paint produced by same manufacturer as finish coats.

B. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

C. Applicator Qualifications: Engage experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with record of successful in-service performance.

D. Mock-up

1. Job Site Sample Areas: Make sample application of high performance epoxy coating on project surfaces to the extent of one system on one wall of one room as directed by Architect.
   a. Obtain acceptance of sample field application before making additional applications.
   b. Accomplish work to equal or exceed standards established by approved samples. Protect and maintain approved field samples through completion of project.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing or reducing.

B. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F in well ventilated area. Restrict storage to paint materials and related equipment.

C. Take precautionary measures to prevent fire hazards and spontaneous combustion. Comply with health and fire regulations.

1.5 PROJECT CONDITIONS

A. Environmental Requirements: Comply with manufacturer's recommendations as to environmental conditions under which painting and finishing can be applied. Do not apply finish in areas where dust is being generated.

B. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture contents of surfaces are below following maximums:

1. Plaster and Gypsum Wallboard: 12 percent.
2. Masonry, Concrete and Concrete Block: 12 percent.
3. Interior Wood: 15 percent.

C. Ensure surface temperature and surrounding air temperature is above 40 degrees F before applying finishes. Minimum application temperature for latex paints for interior work shall be 45 degrees F and 50 degrees F for exterior work. Minimum application temperature for transparent finish shall be 65 degrees F, or surface and air temperature shall be 5 degrees above dew point.

D. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees F for 24 hours before, during and 48 hours after application of finishes.

E. Provide minimum 25 foot candles of lighting on surfaces to be finished.

1.6 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1. Quantity: Furnish Owner with extra paint materials in quantities indicated below:
   a. Interior, Paint: 1 gal. of each color applied.
   b. Exterior, Paint: 1 gal. of each color applied.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers Design Basis –

1. Refer to Finish Legend on Drawings: PPG and Dunn Edwards,
2. Exterior Metal Surfaces with hot dipped galvanizing: Tnemec.
3. Exterior Wood: Sikkens
4. Exterior Plaster/Stucco: Behr.

B. Other Manufacturers as approved:
   1. Sherwin-Williams.
   2. Glidden Professional/Devoe Coatings.
   3. Benjamin Moore.
   4. Mythic Paint.
   5. Frazee.
   6. Kelly Moore.
   7. Vista Paint

2.2 MATERIALS

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
   1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
      a. Products specified are by Sherwin-Williams (S-W), unless otherwise indicated, similar quality products of acceptable manufacturers may be furnished.

C. Sheen: When one of following terms is used to denote specific sheen for coating listed, following index shall apply:
   1. Eggshell: 5 to 20 units based on 60 degrees of sheen.
   2. Semi-gloss: 30 to 65 units based on 60 degrees of sheen.

D. (PT-1), (PT-2), (PT-3), (PT-10), ((PT-11), PT-12), (PT-13), (ST-01): Paint and Stain Types, Sheen, Colors and application locations: Match colors to Finish Legend on Drawings.

2.3 MIXING AND TINTING

A. Deliver paints ready-mixed to job site.

B. Job mixing and job tinting is not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces sheduled to receive paint and transparent finishes for conditions that would adversely affect execution, permanence or quality of work and which cannot be put into acceptable condition through preparatory work. Do not proceed with surface preparation or coating application until conditions are suitable.

3.2 PREPARATION OF SURFACES

A. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified, for each particular substrate condition.
   1. Remove all existing wallcoverings, adhesives and residue wherever visible and new paint or other coatings are indicated in the schedule and drawings.
   2. Remove mildew, by scrubbing with solution of detergent, bleach and warm water. Rinse with clean water and allow surface to dry completely.
   3. Remove surface contamination from aluminum surfaces requiring paint finish by steam, high pressure water or solvent washing. Apply etching primer or acid etch. Apply paint immediately if acid etching.

4. Remove contamination from copper surfaces requiring paint finish by steam, high pressure water or solvent washing. Apply vinyl etch primer or acid etch. Apply paint immediately if acid etching.
5. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of anticipated problems in using specified coating systems with substrate primed by others.
6. Repair Surfaces: Fill hairline cracks, small holes and imperfections on surfaces with patching material compatible with surface. Finish to match adjacent surfaces. Clean and neutralize high alkali surfaces where they occur.

B. Remove hardware, hardware accessories, plates, lighting fixtures, and similar items in-place and not to be finish painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items by workmen skilled in trades involved.

C. Clean surfaces to be painted before applying paint or surface treatment. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program cleaning and painting so that dust and other contaminants from cleaning process will not fall in wet, newly painted surfaces.
1. Remove dirt, oil, grease and sand if necessary to provide adhesion key, when asphalt, creosote or bituminous surfaces require paint finish. Apply compatible sealer or primer.
2. Remove dirt, grease and oil from canvas and cotton insulated coverings.

D. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block and cement plaster to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint.
1. Remove contamination, acid etch and rinse new concrete floors with clear water. Ensure required acid alkali balance is achieved. Allow to thoroughly dry. Repeat procedure if necessary to achieve a medium sandpaper-like profile.
2. Remove dirt, loose mortar, scale, powder and other foreign matter from concrete and concrete block surfaces which are to be painted or to receive clear seal. Remove oil and grease with solution of trisodium phosphate, rinse well and allow to thoroughly dry.
3. Remove stains from concrete and concrete block surfaces caused by weathering of corroding metals with solution of sodium metasilicate after being thoroughly wetted with water. Allow to thoroughly dry.

E. Gypsum Wallboard: Remove contamination from gypsum wallboard surfaces and prime to show defects, if any. Paint after defects have been remedied.

F. Plaster Surfaces: Fill hairline cracks, small holes and imperfections on plaster surfaces with patching plaster. Smooth off to match adjacent surfaces. Wash and neutralize high alkali surfaces where they occur.

G. Galvanized Surfaces: Clean free of oil and surface contaminates with acceptable non-petroleum based solvent.

H. Ferrous Metals:
1. Clean non-galvanized, ferrous surfaces that have not been shop-coated of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning, complying with Steel Structures Painting Council (SSPC)-SP3.
2. Touch-up shop-applied prime coats which have damaged or bare areas. Wire-brush, solvent-clean, and touch-up with same primer as shop coat.
3. Clean unprimed steel surfaces by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly cleaned. Prime surfaces to indicate defects, if any. Paint after defects have been remedied.
4. Sand and scrape shop primed steel surfaces to remove loose primer and rust. Feather out edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. (Prime steel including shop primed steels.)

5. Galvanized metal: Remove oils, passivators and clean entire surface with an appropriate solvent. Pre-treat with a chemical etching solution. Apply primer same day as pretreatment is applied.

I. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off.
   1. Prime or seal wood required to be job painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood.
   2. When transparent finish is required, back-prime with one coat of same material as used for surface.
   3. Seal tops, bottoms and cut-outs of wood doors with coat of surface finish immediately upon delivery to job for field painted doors only.
   4. Scrape and clean small, dry, seasoned knots and apply thin coat of white shellac or other recommended stain-blocking knot sealer, before application of priming coat.
   5. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
   6. Remove dust, grit and foreign matter from exterior wood siding which is to receive paint finish. Seal knots, pitch streak and sappy sections. Fill nail holes with exterior caulking compound after prime coat has been applied.

J. Existing Surfaces to be Repainted or Refinished: Wash surfaces to remove grease, oil, soil or other matter which will interfere with proper bond of new materials. Scrape and wire brush loose or flaking paint. Fill cracks, voids or other defects.

3.3 MATERIALS PREPARATION

A. Mix and prepare painting materials and transparent finish materials in accordance with manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in clean condition, free of foreign materials and residue.

C. Stir materials before application to produce mixture of uniform density, and as required during application of materials. Do not stir any film that may form on surface into material. Remove film and, if necessary, strain material before using.

3.4 APPLICATION

A. Do not apply to wet or damp surfaces.
   1. Wait at least 30 days before applying to new concrete or masonry.
      a. Test concrete for moisture content to verify manufacturer's surface moisture requirements are met.
      b. Follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
   2. Wait until wood is fully dry after rain, fog or dew.
      a. Test wood for moisture content to verify manufacturer's surface moisture requirements are met.

B. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
   1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
   2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
   3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
   4. Apply each coat at proper consistency.
      a. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
   5. Each coat of paint shall be slightly darker than preceding coat unless otherwise approved by Architect.
   6. Provide finish coats which are compatible with prime paints used.

C. Do not apply succeeding coats until previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper, or rub surfaces with pumice stone where required to produce even, smooth surface in accordance with coating manufacturer's directions.
   1. Allow each coat of finish to dry before following coat is applied, unless directed otherwise by manufacturer.

D. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive film thickness equivalent to that of flat surfaces.

E. Finish doors on tops, bottoms, and side edges same as exterior faces, unless otherwise indicated.

F. Film Thickness: Apply materials in accordance to paint manufacturer's recommendations and spreading rates to provide total dry film thickness as recommended.
   1. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated
   2. Use precision instruments designed for measuring and evaluation wet and dry films of paints and coatings.
   3. Results measuring less than recommended thickness will require additional material application.
      a. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
   4. Use of poor hiding colors may require application of additional coats in order to achieve proper coverage and hiding.

G. Apply first-coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

H. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of undercoat.

I. Prime Coats: Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure finish coat with no burn-through or other defects due to insufficient sealing.

J. Stipple Enamel Finish: Roll and redistribute paint to even and fine texture. Leave no evidence of rolling such as laps, irregularities in texture, skid marks, or other surface imperfections.

K. Transparent Finish: On exposed portions, use multiple coats to produce glass-smooth surface film continuity of even luster. Provide finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats, unless otherwise indicated.

L. Repainting of Existing Surfaces: Where repainting of existing surfaces is required, repaint wall and ceiling surfaces in their entirety, patch or spot painting is not acceptable.

M. Paint surfaces behind movable equipment or furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only.

N. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.5 MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to mechanical and electrical documents with respect to field painting and finishing requirements. Painting of mechanical and electrical work is not required in pipe chases, tunnels, and mechanical rooms with unpainted walls.

B. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.

C. Finish paint primed equipment to color selected.

D. Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars and supports, except where items are plated or covered with prefinished coating, or where they are not in finished space or room.

E. Paint interior surfaces of air ducts, convector and baseboard heating cabinets that are visible through grilles and louvers before installation of equipment with 1 coat of flat black paint, to limit of sight line. Paint dampers exposed immediately behind louvers, grilles, convector and baseboard cabinets to match face panels.

F. Paint exposed piping, insulated piping and conduit occurring in finished areas. Color and texture to match adjacent surfaces.

G. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

3.6 CLEANING

A. As work proceeds and upon completion, promptly remove paint where spilled, splashed or spattered. Touch up and restore damaged or defaced painted areas.

B. During progress of work keep premises free from unnecessary accumulation of tools, equipment, surplus materials and debris. Remove at end of each workday.

C. Upon completion of work clean window glass and other paint-spattered surfaces and leave premises neat and clean, to satisfaction of Architect.

3.7 PROTECTION

A. Adequately cover or otherwise protect finished work of other trades and other surfaces from paint and damage. Repair damage as result of inadequate or unsuitable protection as acceptable to Architect.

1. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

B. Place cotton waste, cloths and material which may constitute fire hazard in closed metal containers and remove daily from site.

C. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items shall be carefully stored, cleaned and replaced on completion of work in each area. Do not use solvent to clean hardware that may remove permanent lacquer finish.

D. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.8 EXTERIOR PAINTING AND FINISHING

A. Non-Ferrous Metal Surfaces (Galvanized, Aluminum):

1. Surfaces Included:
   a. Galvanized sheet metal (flashing).
2. Waterborne System, Low-VOC: Waterborne Acrylic Gloss Enamel over Waterborne Metal Primer.
   a. Primer: 1 coat S-W DTM Acrylic Primer, B66W1.
   b. Finish:
      1) 2 coats S-W DTM Acrylic Coating Semi-Gloss, B66-200 Series.
      2) 2 coats S-W DTM Acrylic Coating Gloss, B66-100 Series.

B. Ferrous Metal Surfaces (Steel and Iron) with hot dipped galvanized application:

1. Surfaces included: Fence hardware and connections.
2. Finish Coat Design Basis: Aliphatic Acrylic Polyurethane or approved equal .
   a. Zinc rich epoxy primer: Tnemec Steel Primer Series; Top Secret Coatings MIL-P-26915B; Jotun Barrier Plus; Sumter Coatings Enviro-Zinc Epoxy (100S9785).
   b. Finish coat: Tnemec Series 1075, Endura Shield II.

C. Ferrous Metal Surfaces (Steel, Iron):
   1. Surfaces Included:
      a. Steel lintels, lintel plates, relieving angles.
      b. Roof ventilators, roof vents.
      c. Metal roof stacks.
      d. Exterior ferrous metal.
   2. Waterborne System, Low-VOC: Waterborne Acrylic Gloss Enamel over Waterborne Metal Primer.
      a. Primer: 1 coat S-W DTM Acrylic Primer, B66W1.
      b. Finish:
         1) 2 coats S-W DTM Acrylic Coating Semi-Gloss, B66-200 Series.
         2) 2 coats S-W DTM Acrylic Coating Gloss, B66-100 Series.

D. (PT-12), (PT-13) Wood – Painted:
   1. Surfaces include: Window and Door trim and as noted on drawings and Finish Schedule on drawings.

E. (ST-01) Wood - Unpainted:
   1. Surfaces included: Doors, Planters, Fence and Trellis and other unpainted wood as noted on drawings and Finish Schedule on drawings.:
   2. Finish: Two-Coat Translucent.
      a. Color: Mahogany (confirm match with Architect's sample).

F. (PT-10), (PT-11) Portland Cement Plaster (Stucco):
   1. Surfaces included: Plaster/Stucco Walls.
   2. System:
      a. Primer: 1 coat Behr 436 Multi-Surface Primer and Sealer.
      b. Finish: 2 coats Behr 68 Premium Elastomeric Masonry, Stucco and Brick Paint..

3.9 INTERIOR PAINTING AND FINISHING

A. Ferrous and Non-Ferrous Metal Surfaces:
   1. Surfaces Included:
      a. Unfinished, primed and pre-painted surfaces.
   2. Waterborne System: Waterborne 100% Acrylic Gloss Enamel over Waterborne Metal Primer.
      a. Primer (Touch-up if pre-primed): 1 coat S-W Pro-Cryl Universal Primer, B66-310 Series.
      b. Finish:
         1) 2 coats S-W 0 VOC Acrylic Satin, B66-660 Series
         2) 2 coats S-W 0 VOC Acrylic Semi-Gloss, B66-650 Series.
         3) 2 coats S-W 0 VOC Acrylic Gloss, B66-600 Series.
   3. Waterborne Zero-VOC, Low-Odor System: Zero-VOC, Low-Odor Acrylic over Waterborne Metal Primer; not less than 35 percent solids, ammonia free coating.
      a. VOC Requirement: Not more than 50 grams VOC's per liter,
      b. Primer: 1 coat S-W DTM Acrylic Primer, B66W1.
      c. Finish:
         1) 2 coats S-W ProMar 200 Zero-VOC Interior Latex Semi-Gloss, B31-2600 Series.
         2) 2 coats S-W Zero-VOC Acrylic Gloss, B66-600 Series.

B. (PT-2), (PT-3) Gypsum Wallboard: Where indicated on Finish Plan on Drawings.
   1. Surfaces Included:
      a. Gypsum wallboard, including over skim coat of joint compound.
      b. Apply additional coat of primer under deep tone finish paint.
      c. Walls.
      d. Ceilings.
   2. Water-Based System: Premium Quality Interior Latex Finish not less than 39 percent volume solids over Premium Quality Latex Primer/Sealer.
      a. Primer: 1 coat Interior Primer.
      b. Finish:
         1) 2 coats Interior Latex Egg-Shell.
         2) 2 coats Interior Latex Semi-Gloss.

C. (PT-1) Wood Surfaces for Painted Finish:
   1. Surfaces Included:
      a. Wood doors and frames, except where pre-finish is indicated.
      b. Other wood for paint finish.
      c. Concealed surfaces of wood items to be back-primed.
      d. Primer: 1 coat S-W Premium Wood Primer, B28W8111.

3.10 REPAINTING OF EXISTING SURFACES

A. Existing Surfaces: Existing surfaces where indicated to be repainted.
   1. Latex System: 2 coats paint type as listed above.

END OF SECTION

SECTION 101420
INTERIOR DOOR & ROOM SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Signs as required by code for all doors and openings listed in door schedule.
   2. Double sided tape for attachment.
   3. Wall mounted code required room signage at that side of each room door opening.

B. Related Sections:
   1. Section 010000 – General Requirements.
   2. Section 081400 – Wood Doors.

1.2 SAMPLES

A. Submit samples in accordance with Section 010000.

B. Provide one full size sample sign, of type, style and color specified including method of attachment.

1.3 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 010000.

B. Provide listing of sign types, lettering and locations, to be attached along with overall dimension of each sign.

C. Show all code required signage for example at:
   1. Toilet rooms.
   2. Room entrances at hallways.
   3. Emergency egress and fire protection accessing signs.

1.4 DELIVERY

A. Package separately or in like groups of names, labeled as to names enclosed. Include installation template, hardware or adhesive specified and installation instructions.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer and Type: Acrylic signs by AGS or approved equal.

B. Other Acceptable Manufacturers: No substitutions.

2.2 TYPE

A. Acrylic type complete with adhesive attachment for mounting.

2.3 COMPONENTS

A. Signs: Laminated colored plastic signs at noted wall locations; core color contrasting to exterior face color; total thickness 0.125 inch; 4-5/8 inches tall by 8-1/2 inches wide. Lettering high relief through face material to expose core.
   1. Match Owner's Standards.
   2. Colors to match Owner's Standards.

B. Signs: Laminated colored plastic signs at noted doors; core color contrasting to exterior face color; total thickness 0.125 inch; 8-5/8 inches tall by 8-1/2 inches wide. Lettering high relief through face material to expose core.
   1. Match Owner's Standards.
   2. Colors to match Owner's Standards.

2.4 LETTERING

A. Size and Style:
   1. Match Owner's Standards.
   2. Meet code requirements for lettering stand offs and braille dome sizes.

B. Colors: Match Owner's Standards. Meet code requirements contrast.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install signs after wall and door surfaces are painted and finished, in locations as directed by Architect. Follow standard mounting height details and all other code requirements.

B. Install centered and level, in line, in accordance with the manufacturer's recommendations.

C. Clean and polish, remove excess adhesive.

END OF SECTION

SECTION 102813
TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Toilet and bath accessories.
   2. Building accessories

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 061000 – Rough Carpentry - Rough in for operator furnished and installed accessories.
   3. Section 092900 - Gypsum Board: Metal anchor reinforcement in walls.
   4. Section 096500 – Resilient Flooring.

1.2 SUBMITTALS

A. Submit in accordance with Section 010000

B. Product Data: Illustrate each accessory at large scale and show installation method.

C. Samples: Submit finish samples.

D. Shop Drawings: Submit shop drawings of wood frame for acrylic, thermoplastic mirror sheet assembly including concealed mounting hardware.

E. Schedule indicating types, quantities, sizes, and installation locations (by room) for each toilet accessory item to be provided for project. Also list adjacent OFOI, Operator furnished and installed items for coordination on walls.

F. Setting drawings where cutouts are required in other work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.

G. Maintenance instructions, including replaceable parts and service recommendations.

1.3 QUALITY ASSURANCE

A. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.
   1. Products of other manufacturers listed in Part 2 with equal characteristics, as judged solely by Architect, may be provided.
   2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.

B. Pack accessories individually in manner to protect accessory and its finish.

1.5 PROTECTION

A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this section.

1.6 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Coordinate with owner and operator furnished and installed accessories per F&E lists.

C. Coordinate with Section 061000 for rough-ins for operator furnished and installed accessories.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide accessories by one of the following:

B. Washroom Equipment:

1. Bobrick Washroom Equipment Inc.
2. Safebar.
3. Cascade Specialty.
4. Brey Krause.

C. Mirrors:

1. Fabback

D. Products: Subject to compliance with requirements. Design Basis products that may be incorporated into the Work include, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3. Equals may be allowed as approved by Architect.

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch minimum nominal thickness, unless otherwise indicated. Adhesive: Epoxy type contact cement.

B. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.

D. Mirror Sheets and Frame: 36" x 48" x 0.093" Acrylic, thermoplastic sheet with a reflective film substrate on a ¾" plywood backing surface primed and painted to seal out moisture and cemented with pressure sensitive adhesive with less than 5% solvents.

1. Size and mounting: Cut acrylic, thermoplastic sheet to 24" x 36" size, as noted on plans, and mount in wood frame.
   a. Wood Frame: 1" x 2" frame with mirror sheet inset as detailed similar to match (SG-1) as approved in shop drawings.
2. Acceptable adhesive manufacturers:
   a. Gunther Mirror Mastics.
   b. Palmer Products Corporation.
   c. 3M.

E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners, Screws, and Bolts: Hot dip galvanized. Expansion Shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate. Provide fasteners with finish to match accessories.

2.3 FINISHES

A. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

B. Chrome/Nickel Plating: Satin finish.

C. Stainless Steel: No. 4 satin finish.

D. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

2.4 FABRICATION

A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

C. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.

D. Framed Mirror Units: Fabricate frames for mirror units to accommodate edge protection material, mirror backing and support system that permits rigid, tamper-resistant installation and prevents moisture accumulation.

1. Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
   a. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

E. Provide galvanized steel backing sheet, not less than 0.034 inch and full mirror size, with non-absorptive filler material. Corrugated cardboard is not an acceptable filler material.

F. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 EXECUTION

3.1 PREPARATION

A. Deliver inserts and rough-in frames to jobsite at appropriate time for building-in. Provide templates and rough-in measurements as required.

B. Before starting work obtain through the owner the operators final accessory information and rough in requirements and notify Architect in writing of conflicts detrimental to installation or operation of units.

C. Verify exact location of accessories with Architect. Verify blocking is in place prior to gypsum board installation. Verify that all required rough in for operator furnishied and installed items is in place.

D. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.

3.2 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturer's printed instructions.

B. Install true, plumb and level, securely and rigidly anchored to substrate and sealed to protect structural elements of wall from moisture.

C. Use tamper proof (security) type fasteners.

3.3 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish exposed surfaces in accordance with manufacturer's recommendations after removing labels and protective coatings.

3.4 TOILET AND BATH ACCESSORY SCHEDULE

A. Building Accessories:
   1. (BA-1) Mop and Broom Holder: Bobrick 223, 3 holders, 24 inches long.
   2. (BA-2) Mop and Broom Holder with Shelf: Bobrick B-224 with shelf, 4 holders 36 inches long.

B. Grab Bars:
   1. Grab Bars: 18-gauge type 304 stainless steel, , 1-1/2 inch diameter with concealed mounting, with 1/8 inch thick stainless steel plate.
      a. Sizes:.
         1) (GB-1): 42".
         2) (GB-2): 36".
         3) (GB-3): 24".
      b. Products:
         1) Water Closet areas: Bobrick Series 6806.
         2) Shower areas: Safebar; Cascade.

C. Mirrors:
   1. (MIR-1) Framed Mirrors: Fabback AM3648S-5.

D. Shower Accessories:
   1. Shower Curtain Rods and Flanges: Brey Krause; Flanges S-4650-SS (anti ligature type); 1" dia. Rods U-1024- length-to-suit -SS.
   2. Shower Curtains: Bobrick 204-3 (70" W x 72" H) opaque white vinyl, matte finish with shower curtain hooks (204-1).

E. Shower Folding Seats:
   1. Folding Shower Seats: Bobrick B-5191 (minimum 500# capacity).

END OF SECTION

SECTION 104400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire extinguisher cabinets.
   2. Fire extinguishers in cabinets and on wall brackets.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Section 099000 - Painting.
   3. Division 21 – Fire Suppression: Fire protection system.

1.2 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.
   1. Fire Extinguishers: Include rating and classification.
   2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
   3. Show location of knockouts for hose valves.

B. Samples: Submit samples of cabinet finish for color selection, in accordance with Section 013300.

1.3 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
   1. Provide fire extinguishers approved, listed, and labeled by FMG.

C. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver fire fighting devices in manufacturer's protective packaging as required by project sequencing for installation. Fill and service extinguishers as required before installation.

B. Store and handle with care to prevent damage.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.

1.6 SEQUENCING

A. Apply vinyl lettering on field-painted fire-protection cabinets after painting is complete.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Manufacturers: Basis of design: The design for each fire extinguisher is based on the product named. Subject to compliance with the requirements in this Section, other manufacturer's listed may provide products.
   1. JL Industries / Activar, Inc.
   2. Larsen's Manufacturing
   3. Potter Roemer, Div. of Smith Industries, Inc.
   4. Kidde Fyrnetics.
   5. Nystrom Building Products.

B. Extinguishers
   1. Extinguisher (FE-1): 2-1/2 lb. Type ABC dry chemical.
      a. JL Industries, Cosmic 2-1/2E,
   2. Extinguisher (FE-2): 5 lb. Type ABC dry chemical.
      a. JL Industries, Cosmic 5E
   3. Extinguisher (FE-3): 8 lb, Type 2A, 2-1/2 gal, water misting, non-ferrous canister.
      a. JL Industries, # 272.
   4. Extinguisher (FE-4): 10 lb. Type ABC dry chemical.
      a. JL Industries, Cosmic 10E
   5. Extinguisher (FE-5): 22.5 pounds, Type "K", Wet Chemical; K class; potassium acetate based, low PH agent.
      a. JL Industries, Saturn 15

C. Extinguishers shall be charged and bear inspection tag with charge date.

2.2 FIRE EXTINGUISHER CABINETS

A. Manufacturers: Basis of design: The design for each fire extinguisher cabinet is based on the product named. Subject to compliance with the requirements in this Section, other manufacturer's listed may provide products.
   1. J L Industries: www.jlindustries.com / Activar, Inc.: www.activar.com
   2. Larsen Manufacturing Company: www.larsensmfg.com
   3. Potter Roemer, Div. of Smith Industries, Inc.: www.potterroemer.com
   4. Nystrom Building Products.
   5. Fire Extinguisher Cabinet (FEC-2): J L Industries, Ambassador Series No. 1016-S21.
      a. Description: Steel cabinet, semi-recessed with 1-1/2 trim square trim with solid door
      b. Latch:
         1) Magnetic catch.
      c. Labeling: Vinyl letters vertically.
         1) Lettering Color:
            (a) Red
            (b) Black
      d. Finish:
         1) Prime painted.
         2) Baked enamel finish in color as selected by Architect.
      e. Extinguisher: FE-4

2.3 FIRE EXTINGUISHER 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 baked-enamel finish.
   1. Color: Black.
   2. Manufacturers:
      a. Larsen
      b. JL Industries / Activar, Inc..
      c. Potter Roemer
      d. Kidde Fyrnetics.
      e. Nystrom Building Products.

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.
   1. Weld joints and grind smooth.
   2. Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material.
      a. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
   1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
   2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for hose valves and cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed.

C. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged units.

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

3.2 INSTALLATION

A. Install fire protection specialties and accessories according to reviewed shop drawings and manufacturer instructions.

B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.
   1. Provide inside latch and lock for break-glass panels.
   2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

D. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.

E. Prepare recesses in walls for cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

F. Identification: Apply vinyl lettering at locations indicated.

G. Owner will furnish and install fire extinguishers.

3.3 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet manufacturer.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 113100
RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Kitchen appliances and equipment.

B. Related Sections:
   1. Section 064000 - Architectural Woodwork: Wood cabinetwork.

1.2 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 010000.

B. Samples: Submit samples of factory finish for color selection and appearance acceptance.

C. Product data for each appliance type required indicating compliance with requirements, including installation instructions. Provide complete operating and maintenance instructions for each appliance.

D. Schedule: Submit schedule of appliances, using same room designations as shown on drawings.

1.3 QUALITY ASSURANCE

A. Energy Ratings: Provide residential appliances that carry labels indicating energy cost analysis (estimated annual operating costs) and efficiency information as required by Federal Trade Commission.

B. UL and NEMA Compliance: Provide electrical components required as part of residential appliances that are listed and labeled by UL and comply with applicable NEMA standards.

C. AGA and ANSI Standards: Provide gas-burning appliances that carry design certification seal of American Gas Association (AGA) and comply with ANSI Z21-Series standards.

D. AHAM Standards: Provide appliances that conform to following standards of Association of Home Appliance Manufacturers:
   1. Refrigerators and Freezers: Total volume and shelf area ratings certified according to ANSI/AHAM HRF-1.

E. Single-Source Responsibility: Obtain appliances from single supplier.
   1. Provide products from same manufacturer for each type of appliance required.

F. Design Criteria: Drawings indicate sizes, profiles, and dimensional requirements of residential appliances and are based on specific types and models indicated.
   1. Appliances by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change design concept as judged by Architect.
   2. Burden of proof of equality is on proposer.

1.4 DELIVERY AND STORAGE

A. Deliver appliances to Project site in manufacturer's undamaged protective packaging.

B. Delay delivery of appliances until utility rough-in is complete and construction in spaces to receive appliances is substantially complete and ready for installation.

1.5 WARRANTIES

A. Submit written warranties executed by manufacturer of each appliance specified agreeing to repair or replace units or components that fail in materials or workmanship within specified warranty period.

1. Dishwasher: 5-year warranty on dishwasher motor and pump and 10-year warranty against rust on stainless steel components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Type and Manufacturer: Appliance types and model numbers shall be as specified or comparable units by Whirlpool, Magic Chef, Westinghouse, Sears, Hotpoint, Frigidaire or Maytag.

B. Finish: Manufacturer's standard porcelain enamel finish (in Almond color) (as selected from standard colors).

2.2 KITCHEN APPLIANCES

A. Dishwasher:
   1. Hobart, Model LXeH with DWT-LXe Draintempering Kit.
   2. Other Manufacturers and Models: Equals as approved.

2.3 SOUND ISOLATION

A. Dishwashers: Keep dishwasher from rigid contact with floor and cabinets by using neoprene foam on sides and top, and Mason Type W neoprene pad mounts under feet.

B. Disposals: Installed using rubber collar connections to sinks.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install residential equipment appliances in accordance with reviewed shop drawings and manufacturer's printed instructions. Adjust operating parts of residential equipment for proper operation.

B. Built-In Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements.

3.2 ADJUSTING AND CLEANING

A. Testing: Test each item of residential equipment to verify proper operation. Make necessary adjustments.

B. Accessories: Verify that accessory items required have been furnished and installed.

C. Cleaning: Remove packing material from residential equipment items and leave units in clean condition, ready for operation.

END OF SECTION

SECTION 122413
WINDOW SHADES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Shades at windows, where indicated.

B. Hardware.

C. Related Sections:

1. Section 010000 – General Requirements.
2. Section 061000 - Rough Carpentry: For wood blocking and grounds for mounting shades and accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.

B. Shop Drawings: Show location and extent of shades. Include elevations, sections, details, fabric width and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.

C. Samples for Initial Selection: For each colored component of each type of shade indicated.

1. Include similar Samples of accessories involving color selection.

D. Shade Material Samples for Verification: Not less than 3 inches square, with specified treatments applied. Mark face of material.

E. Product Certificates: For each type of shade, signed by product manufacturer.

F. Qualification Data: For Installer.

G. Product Test Reports: For each type of shade.

H. Maintenance Data: For shades to include in maintenance manuals. Include the following:

1. Methods for maintaining shades and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
3. Operating hardware.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Source Limitations: Obtain shades through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide shade materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Flame-Resistance Ratings: Passes NFPA 701.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace damaged shades within specified warranty period.

B. Warranty Period: 5 years..

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. (WT-1) Cordless, Lift "n" Lock, ½" Premier double-cell light filtering fabric shade.
   1. Inside mount type.

B. Manufacturer and Type: Select Blinds.

C. Color: As selected by Architect from manufacturer's standard colors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SHADE INSTALLATION

A. Install shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass.

3.3 ADJUSTING

A. Adjust and balance shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage factory-authorized service representative to train Owner maintenance personnel to adjust, operate, and maintain system.

END OF SECTION

SECTION 129300
SITE FURNISHINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install all site furnishings shown on drawings and specified in accordance with the manufacturer's instructions and as shown on the drawings and as specified.
B. Related requirement specifications elsewhere:
   1. 321320 Site Concrete
   2. 329000 Planting

1.2 REFERENCES

A. Manufacturer's Instructions:
   1. Where required in the Specifications that materials, products, processes, equipment or the like to be installed or applied in accordance with manufacturer's instructions, directions or specifications, or words to this effect, it shall be constructed to mean that said application or installation shall be in strict accordance with printed instructions furnished by the manufacturer of the material for use under conditions similar to those at the job site.
   2. All site furnishings shall be anchored or otherwise secured to prevent movement, unless stated otherwise. Provide concrete footings, corrosion resistant clips, etc. as accepted by the Contracting Officer's Representative.
B. Reference Standards:
   1. State of California, Business and Transportation Agency, Department of Transportation: "Standard Specifications."
   2. Manufacturers' specifications and recommendations.

1.3 COORDINATION

A. Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in concrete and for the provision of connections, holes, openings, etc., necessary to the execution of the work of the trades.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES
B. Straight Wood Bench with Back: Shop drawings by manufacturer, color/finish samples for wood and metal.
C. Curved Wood Bench with Back: Shop drawings by manufacturer, color/finish samples for wood and metal.

PART 2 - MATERIALS

2.1 CURVED WOOD BENCH WITH BACK

A. Product: Customized YB Bench with back, surface mount post, with armrests, manufactured by SiteCraft, Inc. (800-937-0203, www.site-craft.com) or approved equal.
B. Dimensions:
   1. Provide bench lengths at custom radii and arc angle as per plans and customized per design intent shown in the drawings.
C. Materials:
   1. Seat slats: FSC 100% Redwood or approved equal.
   2. Bench frame: solid aluminum with invisible welds
   3. Slat fasteners: as specified by manufacture
   4. Armrests: Galvanized steel
D. Finishes:

1. Seat slats: penetrating oil finish.
2. Bench frame: polyester powder-coat “Silver”.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Install manufactured items in accordance with the manufacturer's instruction and as shown in the drawings and as specified herein.
B. Set all work true and square, plumb and level. Remove and replace any wood that splits during or after erection until acceptance. Keep nailing neatly lined up.
C. Fabricate wood in as long pieces as practical unless otherwise indicated. End joints shall occur at supports. Keep all work clean, accurately cut, closely fitted and set to the required lines and levels. Blunt exposed edges by sanding or with plane.
D. Place washer under the head and nut of bolts where same bear on wood, except head of carriage bolt. Drill bolt holes same diameter as bolt.
E. Size bolts to fit flush with nuts. Countersink nuts and bolts as detailed.
F. Hammers with scored faces shall not be used in nailing.
G. Supply all miscellaneous metal units and install as specified herein under the Sections entitled "Miscellaneous Metalwork" and "Galvanizing." Hot-dip galvanize all metal fastenings, angles, etc., after complete fabrication.
H. Galvanized metal that is cut, damaged or modified after fabrication shall be immediately painted with Zinc-rich paint to prevent rusting.
I. Touch up paint any damaged surfaces to match original finish as accepted by Contracting Officer's Representative.
J. Transport, store and handle precast units and manufactured items in a manner to avoid hairline cracks, staining or other damage. Store units free of the ground and protected from mud or rain splashes. Cover units, secure covers firmly, and protect the units from dust, dirt or other staining material.

3.2 CURVED WOOD BENCH WITH BACK

A. Install level and in accordance with the manufacturer's instruction and as shown.

3.3 FINAL CLEANUP

A. Remove all trash, debris, surplus materials and equipment from the project site when the work of this Section has been completed and at such other times as may be directed by the Contracting Officer's Representative.
B.

END OF SECTION

SECTION 144200
WHEELCHAIR LIFTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wheelchair lift.
   2. Ramp, safety sensors and fascia plate.
   3. Guide rails, brackets and brake system.
   4. Motor, controls, connection to gates, and wiring to main switch.

B. Related Sections:
   1. Section 010000 - General Requirements.
   2. Electrical service to lift equipment.

1.2 REFERENCES

A. ANSI A17.1 - American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks.

B. ANSI A17.16 - Supplement to Safety Code for Elevators and Escalators.

C. ANSI A17.2 - American National Standard Practice for Inspection of Elevators, Escalators, and Moving Walks.

D. ASME A18.1. American National Safety Standard for Platform and Stairway Chair Lifts.

E. ANSI C2 - National Electrical Safety Code.

F. Welding AWS D1.1.

1.3 SUBMITTALS

A. Submit shop drawings clearly indicating component details, materials, finishes, installation details and relation to adjacent construction.

B. Submit 3 sets of operation and maintenance manuals.

C. Submit samples of side panels for color and appearance acceptance.

D. Certificates and Permits: Provide Owner with inspection and acceptance certificates and operating permits, as required by authorities having jurisdiction, for unrestricted use of lifts.

1.4 SYSTEM DESCRIPTION

A. Capacity: 750 lb.

B. Travel Speed: 20 fpm.

C. Motor: 120 VAC, 60 Hz, 20 amp, single phase, 60 Hz, with minimum 1/2 HP, and 1,725 rpm instant reverse capability. Lift shall stop automatically at desired landings.

D. Emergency Power:
   1. Battery operation in down direction – Standard.
   2. 24VDC Battery raising and lowering.

E. Controller: Relay logic based controller.

F. Motor/Pump: 1HP (112 kw), gear type

G. Drive: Roller chain hydraulic.

1.5 PROTECTION

A. Protect lift and finishes from damage during delivery and installation.

B. Protect adjacent surfaces, finishes and materials from damage during installation of lift.

1.6 PROJECT CONDITIONS

A. Examine supporting structure and conditions under which lift is to be installed, and notify Contractor in writing of conditions detrimental to proper and timely completion of work.

B. Coordinate work directly with other subcontractors as necessary to insure proper fitting, joining to or clearance of their work. Furnish or exchange shop drawings and resolve required dimensions and details.

1.7 QUALITY ASSURANCE

A. Manufacturer shall provide complete system specified only with new materials and parts.
   1. Manufacturer may provide factory reconditioned parts only with written approval by the Owner and Architect.

B. Lift installer shall be either lift manufacturer or licensee of manufacturer, who is currently under contract for maintenance of similar lifts in area, who maintains service center in area, and who is willing to enter into maintenance agreement with Owner.

C. Lifts shall comply with ANSI A17.1 - Elevators, Dumbwaiters, Escalators, and Moving Walks and ANSI C2 - National Electrical Safety Code.

1.8 MAINTENANCE SERVICE

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

B. Continuing Maintenance Service: Provide continuing maintenance proposal from Installer to Owner, in form of standard yearly maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.9 WARRANTY

A. Manufacturer: Coverage applies to the repair or replacement of parts that fail due to defective material or workmanship.
   1. The manufacturer shall offer a 36-month limited warranty on parts from date of shipment.

B. Authorized Dealer/Installer: Minimum 1 year warranty on workmanship and labor charges for the removal, repair or replacement of warranty parts.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer and Type: Savaria Lifts Inc.; V1504, Type 1L vertical wheelchair lift.

B. Other Acceptable Manufacturers: Access Industries or approved equal as submitted to Architect.

2.2 WHEELCHAIR LIFT SYSTEM

A. Terminal stopping devices.

B. Slack cable safety device.

C. Grounded electrical system with upper, lower, and final limit switches and 24 VAC operating controls.

D. Fixed access ramp, 42 inch high guard panels and non-slip platform and access ramp surfaces.

E. Security key lockout on controls, keyed to building masterkey system.

F. Bottom landing doors with self closures and electric strikes.. See door schedule in architectural drawings for door types. Contractor to provide alternate pricing for lift manufacturer supplied rated doors.

G. Tamper-proof electro-mechanical interlocks which allow platform movement only when doors are closed and locked.

H. Grab rail for rider on platform.

I. Emergency stop which shuts off power to lift.

J. Manual lowering device capable of raising or lowering platform in event of power or component failure.

K. Provide ADA compliance telephone at lift.

2.3 PLATFORM

A. Side Guards of platform shall have a steel frame with a powder coat finish and steel panel inserts to a minimum of 42 inches (1067 mm) high.

B. Side Guards of platform shall have a steel frame with a powder coat finish and steel panel inserts to a minimum of 80 inches (2032 mm) above the upper landing. A steel ceiling with an egg crate insert and 4 x LED lights shall be provided.

C. Side Guards of platform shall have a steel frame with a formica finish to a minimum of 80 inches (2032 mm) above the upper landing. The formica choice will be selected from manufactures standard offerings. A steel ceiling with an egg crate insert and 4 x LED lights shall be provided.

2.4 FABRICATION

A. Verify dimensions on site prior to shop fabrication.

B. Fabricate lift to size and shape indicated on drawings. Fit and shop assemble in largest practical sections for delivery to site and installation.

C. Supply components required for proper anchorage of lift.

2.5 FINISH

A. Factory Finish: Painted surfaces with polyester finish in standard color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine installation areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting work.

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

3.2 INSTALLATION

A. Install wheelchair lift in accordance with reviewed shop drawings and the manufacturer's printed instructions.

B. Perform work with competent mechanics skilled in this work.

C. Install machinery, guides, controls, lift and equipment and accessories in accordance with applicable codes and standards to provide quiet, smoothly operating installation, free from side sway, oscillating or vibration.

3.3 ADJUSTING AND CLEANING

A. Prior to final acceptance, clean all surfaces, remove tools, equipment and surplus material from site.

B. Make necessary adjustments of equipment to ensure lift operates smoothly and accurately.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

3.4 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operation, and maintenance of lifts. Review emergency procedures, including emergency access and procedure to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedure to follow in identifying sources of operational failure or malfunction.

END OF SECTION