

MONTEREY COUNTY
RESOURCE MANAGEMENT AGENCY

PUBLIC WORKS - ARCHITECTURAL SERVICES

VOLUME TWO OF THREE

PROJECT MANUAL

SAN LUCAS BRANCH LIBRARY
PROJECT NO. 8548
BID NO. 10542



Kitchell CEM
2750 Gateway Oaks Drive, Suite 300
Sacramento, California 95833

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SECTION 011100
SUMMARY OF WORK

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Work of this Contract includes the construction of the new San Lucas Branch Library and associated site work.
- B. The Contractor shall perform the Work under a single, fixed-price Stipulated Sum Contract.

1.2 CONTRACTOR'S DUTIES

- A. Unless otherwise specified or required, provide and pay for all of the following:
 - 1. Labor, materials, and equipment.
 - 2. Tools, construction equipment, and machinery.
 - 3. Transportation, inspection, and other facilities and service necessary for the proper completion of the construction of the Work in accordance with the Contract.
 - 4. Legally required sales, consumer, and use taxes.
- B. Provide all services incidental to administration of the construction of the Project and keep the County informed of the progress and quality of the Work.
- C. Provide property boundary, right-of-way, topographic, hydrographic, utility surveys, soil mechanics, and subsoil data as required.
- D. Give required notices.
- E. Comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities which govern the performance of the Work, shall file documents required to obtain necessary approvals of governmental authorities having jurisdiction over the Project.
- F. Promptly submit written notice to the County of any observed variances of the Construction Documents from legal requirements.
- G. Enforce strict discipline and good order among employees. Do not employ persons on the job who are unfit or unskilled in their assigned tasks.
- H. Maintain appropriate accounting records, including separate accounts for changes.
- I. Consult with the County to obtain interpretations of the Construction Documents. Assist in resolutions of questions and transmit written interpretations to concerned parties.
- J. Minimize impact on adjacent facilities (County-owned or privately-owned).

- K. Refer to the CONTRACT REQUIREMENTS and Specification Division 1 Sections for further information.

1.3 EXAMINATION OF SITE AND WORK

- A. Contractor shall examine the location, physical conditions, and surroundings of the proposed Work and judge for itself the extent to which these factors will influence the performance of the Work.

1.4 PROGRESS AND COMPLETION

- A. The Work shall be commenced upon receipt of the Notice to Proceed, and shall be performed in complete accordance with the Contractor's Work Plan and Progress Schedule. The Contractor shall perform his Work in an expedient manner furnishing enough equipment and staff to maintain at all times Contractor's program of Work.
- B. It is expressly agreed that time is of the essence of this Contract, and Contractor agrees to perform the Work within the time and in the manner specified, or within the time of such extensions as may be granted. Contractor shall be liable for liquidated damages for failure to meet the completion date.
- C. In the event that the rate of actual progress of the Work falls behind the estimated progress indicated on the Contractor's Progress Schedule, the Contractor shall accelerate the Work, at no additional cost to the County, by placing additional forces and equipment on the Project, or any other means so that the Project will be completed within Contract Time irrespective of the Contractor's claim for time extensions.
- D. The Contractor shall not begin construction until he has notified the County of his intention to do so, stating the time when Work is to commence. Such notices shall be issued at least twenty-four (24) hours prior to the time when actual Work is scheduled to commence. The Contractor shall continuously staff the job with no interruption of Work. The Contractor shall keep the County advised of his Work schedule with weekly Work Plans.
- E. The Contractor shall provide the necessary crews and workers to simultaneously meet the schedule requirements for constructing all facilities within the Contract duration which may require multiple crews on multiply fronts and critical paths simultaneously.

1.5 WORK RESTRICTIONS

- A. Access to Site:
 - 1. Notify the County, adjacent property owners, and local governing agencies, as applicable, as required by the local governing agencies but not less than 72 hours in advance of performing Work that necessitates closing or interfering with traffic on public thoroughfares, parking areas, and driveways. Obtain written permission prior to effecting such closures and interruptions.
 - 2. The County will designate an entrance to the Site for the Contractor's use.
- B. Use of Premises:
 - 1. Use of the premises for Work, storage, and vehicular parking shall be limited to the areas designated or approved by the Construction Manager.

2. If the areas on the premises are not sufficient, obtain and pay for the use of additional Work, storage, and parking areas needed. Include such costs in the Stipulated Sum.
3. Use the premises for work and construction operations to allow work by other County contractors, utility companies, and the County.

1.6 SITE CONDITION SURVEY

- A. Prior to commencement of Work, the County and Contractor shall jointly photograph the Site, including but not limited to existing buildings, paving, plant life, and other items, documenting conditions and damage such as cracks, sags, loose masonry, and unhealthy plant life.
- B. The photograph record shall serve as a basis for determination of subsequent damage to these items due to settlement or movement due to demolition and construction operations.
- C. Such damage, as noted, shall be suitably marked on the item, if possible, and the official record of existing damage shall be signed by the parties making the survey.
- D. Cracks, sags, or other damage to the Site and adjacent buildings, paving, plant life, and other items not noted in the original survey but subsequently observed shall be reported in writing immediately to the County.

1.7 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. Locate existing utilities before proceeding with excavation, drilling, and other operations that may cause damage; maintain them in service where appropriate; and repair damage to them caused by the performance of the Work at no increase in the Contractor's Bid Proposal.
- B. Maintain existing utilities in continuous operation without an interruption in utility service or access.

1.8 PERMANENT UTILITY SERVICES

- A. Work includes all operations necessary to place required utility services in operating condition, including service lines, permanent meters, connections, and inspections.
- B. The Work, when so indicated or specified, includes installation of telephone conduit, backboards, and terminal cabinets and cooperation with the serving utility company for the installation of other telephone equipment and cable.
- C. The County will arrange and pay for permanent telephone switchboards, instruments, and cables.
- D. All other expenses in connection with utility service installations shall be borne by the Contractor.

1.09 USE AND OCCUPANCY OF WORK PRIOR TO ACCEPTANCE BY THE COUNTY

- A. The County may use and occupy the portions of the Work before formal Acceptance under the following conditions:

1. Occupancy by the County shall not mean as being an Acceptance of that part of the Work to be occupied.
3. The Contractor will not be held responsible for any damage to the occupied portion of the Work resulting from the County's occupancy.
4. Occupancy by the County shall not be deemed to constitute a waiver of existing claims on behalf of the County or Contractor against each other.
5. If required by the County for areas it has beneficially occupied, make available, on a 24-hour-a-day, 7-day-a-week basis, utility services, heating, and cooling as are in condition to be put in operation when such Beneficial Occupancy occurs. Be responsible for the operation and maintenance of such equipment while it is so operated until the Work is complete and the affected areas occupied, at which time operation and maintenance of such equipment shall be assumed by the County when Contract requirements for such equipment have been met.
6. Make an itemized list of each piece of equipment operated during Beneficial Occupancy, with the date operation commences; submit to the County Representative who will transmit it to the County. This list shall be the basis for the commencement of guarantee periods on the equipment being operated for the benefit of the County's occupancy.
7. The County will pay the utility costs associated with its occupancy during construction.

PART 2 – PRODUCTS - (Not Applicable)

PART 3 – EXECUTION - (Not Applicable)

END OF SECTION

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SECTION 012200

UNIT PRICES AND PAYMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Measurement and payment criteria applicable to portions of the work performed under a unit price payment method.

B. Related Documents and Sections

1. Refer to requirements of Division 0.
2. Section 01 11 00 – Summary of Work

1.2 DEFINITIONS

- ###### A. Fixed Costs:
- Necessary labor, materials, and equipment costs directly expended on the item or items under consideration, which remain constant regardless of the quantity of work done.

1.3 UNIT QUANTITIES

- ###### A.
- Quantities indicated are for bidding and contract purposes only.

- ###### B.
- If the actual Work requires more or less quantities than those quantities indicated, provide the required quantities.

1.4 INCREASED QUANTITIES, UNIT PRICE ITEMS

- ###### A.
- Work in excess of 100 percent, but less than or equal to 125 percent of the estimated quantity will be paid for at the unit price indicated.

- ###### B.
- Work in excess of 125 percent of the estimated quantity not covered by an executed change order will be paid for by adjusting the unit price.

1. The adjustment of the unit price will be the difference between the unit price and the actual unit cost. The actual unit cost will be determined in accordance with General Conditions.

2. Fixed costs will be deemed to be recovered by payments made for 125 percent of the estimated quantity, and will not be included in determining the adjustment.

1.5 DECREASED QUANTITIES, UNIT PRICE ITEMS

- ###### A.
- Work in the quantity of 75 percent or more, but less than 100 percent of the estimated quantity will be paid for at the unit price indicated.

- ###### B.
- Work greater than zero but less than 75 percent of the estimated quantity not covered by an executed change order will be paid for by adjusting the unit price, upon Contractor's written request.

1. The adjustment of the unit price will be the difference between the unit price and the actual unit cost, including fixed costs.
2. The actual unit costs will be determined in accordance with General Conditions, inclusive, plus a markup of 22 percent and 15 percent on the actual costs for labor and materials, respectively.
3. In no case will payment exceed that which would have been made for 75 percent of the estimated quantity at the Contract unit price.

1.6 MEASUREMENT OF QUANTITIES

- A. Measurement devices shall be acceptable to the County Representative.
- B. Take all measurements and compute quantities. The County Representative will verify the measurements and quantities.

1.7 PAYMENT

- A. Payment Includes:
 1. Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals.
 2. Erection, application or installation of an item of the work when specifically indicated.
 3. Indirect costs, overhead, and profit.
 4. Payment for Work governed by unit prices will be determined by the actual measurements accepted by the County Representative, multiplied by the unit price, or adjusted unit price as applicable, for that item of Work.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Definitions.
 - 2. Requirements.
 - 3. Selection and Award of Alternates.

- B. RELATED SECTIONS

- 1. Refer to requirements of Division 0.

1.2 DEFINITIONS

- A. Alternates: Modifications to work included under Base Bid.
- B. Base Bid: Work, without consideration of any Alternates.

1.3 REQUIREMENTS

- A. Coordinate related work and modify surrounding work to integrate the Work of each accepted Alternate.

1.4 SELECTION AND AWARD OF ALTERNATES

- A. Indicate variation of Bid Price for Alternates described below and include in Bid Proposal Form.
- B. Alternates quoted on Bid Proposal Form will be reviewed and accepted or rejected at Department's option.
- C. Accepted Alternates will be identified in the County/Contractor Agreement.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Installation of the trellis structure at the north of the building as described in the drawings.
- B. Alternate No. 2: Add concrete patio at north side of building as shown in lieu of turf irrigation and 3 x 6 concrete pad at door 1 as indicated in drawings.
- C. Alternate No. 3: Installation of landscaping and irrigation where indicated in the drawings.

END OF SECTION

SECTION 012500

PRODUCT SUBSTITUTIONS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes administrative and procedural requirements governing the Contractor's selection of products for use in the Project and requirements governing substitutions.

1.2 DEFINITIONS

A. Products:

1. The term "product" includes materials, systems, and equipment. Products shall be new, undamaged, of the types specified, and furnished in ample quantities to facilitate proper execution of the Work.
2. An "equal" product is any material, product, thing, or service which is in all respects equal to the item specified, including, but not limited to size, quantity, guarantees, and materials. The final determination of whether or not a proposed substitution product is "equal" to the specified product rests with the County and the Architect. An equal shall qualify as such where material, product, or system proposed as equal conforms with descriptive, performance, or proprietary requirements of the Construction Documents. In determining equals, the County's judgment will be final and County reserves the right to consider unequal any material, product, or system which, though in conformity with the CONTRACT REQUIREMENTS, exhibits features which the County deems objectionable even though not specifically disallowed by the Construction Documents.
3. Where available, provide standard products or types which have been produced and used previously and successfully on other projects and in similar applications.

B. Substitutions:

1. A "substitution" is any material, product, thing, or service which may or may not be equal, as determined by the County and Architect, in all respects to the specified item but which is proposed by the Contractor to be used in lieu of the specified item.
2. The manner of specification shall determine whether a submittal will be considered a substitution, to be accepted or rejected according to criteria stated in this SECTION.
 - a. Where specification is by manufacturer's trade name or model designation, item which bears different trade name or model designation will be considered a substitution.
 - b. Where specification is by reference to standards of trade, industry, or governmental organizations, item not in compliance with standards referenced will be considered a substitution.

- c. Item that does not conform to descriptive, performance, or dimensional requirements shown or noted in the Construction Documents will be considered a substitution.
 - d. Where specification is by combination of descriptive material, reference to standards, performance criteria, or manufacturer's trade names and there are discrepancies or conflicts between requirements specified, the County reserves the right to consider item a substitution which fails to satisfy one or more requirements of the specification. A person who discovers such discrepancies shall request clarification by Addendum during the bidding period.
3. Failure to order materials or equipment in a timely manner will not constitute justification for a substitution.

1.3 GENERAL REQUIREMENTS

- A. In agreeing to the terms and conditions of the Contract Documents the Contractor has accepted the responsibility to schedule and verify that the specified products will be available when needed to comply with the accepted schedule, and to place orders for all required materials in a timely manner to meet the accepted schedule without delay in the Work.
 - 1. Exception: When product numbers or models specified have been discontinued or changed by the specified manufacturer(s) prior to issuance of Notice to Proceed or signing of the Agreement.
- B. Products shall be:
 - 1. New and undamaged, whether using recycled content or not.
 - 2. Best of their respective kind.
 - 3. Furnished in a timely manner, in ample quantities to facilitate proper and timely execution of the Work.
 - 4. Suitable for the use intended.
 - 5. Of one manufacturer for each specific purpose, insofar as practicable.
 - 6. In conformance with EPA codes and regulations and the applicable air quality control district.
 - 7. Complete with all accessories, trim finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
 - 8. Free of asbestos, polychlorinated biphenals (PCBs), radioactive waste, hazardous waste, and any other material detrimental to human health and safety.
- C. Wherever possible of types that have been produced and used successfully in similar situations on other projects.

- D. No lead-containing powder driven anchors are permitted. Whenever powder driven anchors are specified or indicated, provide equivalent strength non-lead containing powder driven anchors.
- E. Minimum Quantities or Quality Levels:
1. In every instance the quantity or quality level shown or specified is the minimum to be provided or performed.
 2. Within specified tolerances the actual installation may comply exactly with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits.
 3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements.
 4. Refer instances of uncertainty to the County for a decision before proceeding.
- F. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project; the Contractor shall verify that the product selected will be compatible with the products previously selected, even if previously selected products were also options.
- G. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is inconspicuous.
 2. Equipment Nameplates:
 - a. Provide a permanent nameplate on each item of service-connected or power-operated equipment.
 - b. Locate on an easily accessible surface that is inconspicuous in occupied spaces.
 - c. The nameplate shall contain the following information and other essential operating data:
 - 1) Name of product and manufacturer.
 - 2) Model and serial number.
 - 3) Capacity.
 - 4) Speed.
 - 5) Ratings.

1.4 TRANSPORTATION AND HANDLING

- A. Deliver manufactured products in the manufacturer's original, unbroken containers or packaging, with identifying labels intact and legible.
- B. Immediately on delivery, inspect shipments to assure compliance with the requirements of the Construction Documents and Accepted Submittals, and to verify that products are properly protected and undamaged.
- C. Handle products in a manner to avoid soiling and damaging the products and their packaging.
- D. Promptly remove damaged and defective products from the Site, and replace at no additional cost to the County.

1.5 STORAGE

- A. Store manufactured products in accordance with the manufacturers' printed instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weathertight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by manufacturers.
- B. Exterior Storage:
 - 1. Store fabricated products above the ground, on blocking or skids, to prevent soiling and staining.
 - 2. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
 - 3. Store loose granular material in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Arrange storage to facilitate inspection.
- D. Periodically inspect stored products to assure that products are maintained under specified conditions and free from damage and deterioration.
- E. Protection After Installation:
 - 1. Provide substantial coverings as necessary to protect installed products from damage from traffic and construction operations. Remove coverings when no longer needed.
 - 2. Maintain temperature and humidity conditions for interior equipment and finish products in accordance with the manufacturers' printed instructions.

1.6 PRODUCT OPTIONS

- A. Product selection is governed by the Construction Documents and governing regulations. Procedures governing product selection include the following:
1. For products specified by descriptive requirements only, select any product by any manufacturer meeting description and is recommended by manufacturer for the application Indicated. Products not in compliance with the requirements will be considered substitutions.
 2. For products specified by performance requirements only, select any product by any manufacturer meeting requirements and is recommended by manufacturer for the application Indicated. General overall performance of a product is implied where the product is specified for a specific application. Manufacturer's recommendations may be contained in published literature or by manufacturer's written certification of performance. Products not in compliance with the performance requirements Specified or Indicated will be considered substitutions.
 3. When both the specified process and the guarantee of the results are specified; the Contractor shall notify the Architect and Construction Manager if in it's judgment the process may not produce the required result, and offer for review an alternative process that it would guarantee.
 4. For products specified only by reference standard of trade, industry, or governmental organizations, select any product by any manufacturer meeting such standard. Refer to SECTION 014216 "REFERENCES" for further information.
 5. Where more than one manufacturer's product is specified, the first-named product is the basis for the design used in the Work and the use of alternative-name manufacturers' products or substitutes may require modifications in that design.
 - a. If such alternatives are proposed by Contractor and are approved by the Architect, the Contractor shall assume all costs required to make necessary revisions and modifications to the design, including additional costs to the Architect for evaluation of revisions and modifications of the design resulting from the substitutions submitted by Contractor to the County.
 6. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equal", "equal to", "or approved equal", or "equivalent to" before or after specified product, submit a request, as required for substitution, for any product not specifically named.
 7. Where catalog numbers and specific brands or trade names, not followed by the designation "or equal", are used in conjunction with material or equipment required by the Specification SECTIONS, no substitutions will be approved because of the design aesthetic pre-approval process required by the Architect in accordance with Article 14 of general Conditions.

- B. Where the specifications require matching an established sample or samples when a color range is given, the County and the Architect's decision will be final on whether a proposed product is satisfactory.
 - 1. Where no visual match can be satisfactorily made, in the Architect's opinion, even though the product selected conforms to other specified requirements, comply with provisions of this SECTION concerning "substitutions" for selection of a matching product in another product category, or for non-compliance with specified requirements. The County may reject products based solely on lack of visual match.
 - 2. Where specified product requirements include the phrase "as selected from manufacturer's palette" or "as selected from manufacturer's standard colors, patterns, textures", or similar wording, the Architect will select the color, pattern and texture from the product line selected.

1.7 MATERIALS CERTIFICATION

- A. Certify that all materials incorporated into the Work are free from asbestos, radioactive waste, hazardous waste, and any other material detrimental to human health and safety and conform to all codes for health, safety, ADA, and environmental regulations, and conform to the Specifications for the Work.
- B. Notify the County, and request the County's permission, before incorporating into the Project any materials specified by the Construction Documents that the Contractor knows or has reason to know are contaminated by asbestos, radioactive waste, hazardous waste or any materials detrimental to human health and do not conform to all codes for health, safety, ADA, or environmental regulations.

1.8 REQUIREMENTS FOR SUBSTITUTIONS

- A. The County will consider written requests from the Contractor for substitutions when submitted in compliance with the following.
- B. Products proposed for substitution shall comply with specific performances indicated and/or specified, and which are recommended by the manufacturer (in published product literature or by individual certification) for application indicated. Overall performance of a product is implied where product is specified with only certain specific performance requirements. All substitutions proposed shall be accompanied by written certification from the Contractor that the substitution meets the intent of the Construction Documents.
- C. Products proposed for substitution shall have been produced in accordance with prescriptive requirements, using specified ingredients and components, and complying with specified requirements for fabricating, finishing, testing, and similar operations in manufacturing process.
- D. A proposed substitution shall not be purchased or installed by the Contractor without written acceptance from the Architect in accordance with Article 14 of general Conditions.
- E. The Contractor shall be responsible for the effect of a substitution of related Work in the Project, and shall pay additional costs generated by a substitution, including the costs of the County's or County's representative's additional services.

- F. The burden of proving that the proposed substitution is "equal" to the specified product is upon the Contractor such proof shall include sufficient factual and comparative data and information necessary to establish that the requested substitution is equal in quality, utility, structural strength, mechanical and technical performance, finish, arrangement of plan, repair and maintenance, compatibility with other existing or specified items, and any other relevant data.
- G. By making a request for substitution, the Contractor:
1. Represents that he has personally investigated the proposed substitute product and has determined that it is equal or superior in all respects to the specified product.
 2. Represents that the proposed substitute product is in full compliance with the requirements of the Construction Documents and applicable regulatory requirements and does not affect dimensions or functional clearances. The Contractor shall be solely responsible for securing regulatory approvals for substitutions.
 3. The proposed substitute product will have no adverse affect on other trades and will not adversely affect or delay the construction schedule.
 4. Represents that he will provide the same guarantee or warranty for the substitution that he would have for the specified product.
 5. Will coordinate the installation of the proposed substitute product into the Work, making sure changes as may be required for the Work to be complete in all respects and in compliance with the Construction Documents and applicable regulatory requirements.
 6. Certifies that the cost data presented is complete and includes all related costs under the Contract.
 7. Waives all claims for additional costs or schedule impact related to the substitution which subsequently become apparent.
- H. Adjacent materials have been designed and detailed to accommodate the established standard manufacturer's products. If one of the other approved manufacturers is selected by the Contractor, the Contractor shall detail all changes in all adjacent materials necessary to accommodate the selected products, shall submit such changes for review by the County, shall pay for all changes to the Construction Documents to accommodate the selected products, and when approved shall make such changes to the Work at no cost to the County.
- I. Substitutions will not be considered if:
1. They are indicated or implied on Shop Drawings, Product Data, or other submittals without formal request submitted in accordance with this SECTION.
 2. Acceptance will require substantial revision of the Construction Documents.
 3. The proposed product is inferior to the specified product, as judged by the Architect.

- 4. The request does not include sufficient factual and comparative data or information for the Architect to make a reasonable judgment regarding the acceptability of the proposed substitution.
 - 5. The proposed substitution increases the cost of Work or Contract Time.
 - 6. It is a result of the Contractors failure to execute the Work in a timely manner or properly coordinate activities.
- J. The Architect will be judge of the acceptability of proposed substitutions, and its determination will be final in accordance with Article 14 of General Conditions.
 - K. Approval of a substitution shall not relieve the Contractor from responsibility for the proper execution of the Work and other requirements of the Construction Documents.
 - L. If a substitution is rejected, provide the product originally specified.

1.9 REQUESTS FOR SUBSTITUTIONS

- A. Submit five (5) copies of a written request for a substitution and data substantiating the request to the Contractor in enough advance notice to allow a thorough evaluation. Each request shall include the following:
 - 1. For Products:
 - a. Complete technical data of all characteristics of the originally specified item, including drawings, reference standards, performance specifications, cost data, samples, and test reports of the product proposed for substitution. Submit additional information if requested. Annotate the specific salient characteristics that are being compared to those of the originally specified item. The mere submission of catalog cuts and/or other data without the annotation is not acceptable. Refer to the following paragraph that requires line-by-line comparison.
 - b. Product Data similar to that specified for the item for which the substitution is proposed, including manufacturer's name and address and the name and telephone number of the manufacturer's representative. Include a line-byline comparison of characteristics between specified item and proposed substitute documenting equal status. Highlight by underlining or other means characteristics that are different from those of the specified item. Equivalency will be based on salient characteristics as determined by the County.
 - c. Samples, if requested, of both the originally specified product and the proposed substitute product.
 - 2. For Construction Methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
 - 3. Reason for request.

4. Data related to required changes to the current Progress Schedule.
 5. Complete breakdown of price indicating the dollar amount to be added or deducted if the proposed substitution is accepted.
 6. Certification by the Contractor that the proposed substitution is in compliance with the Construction Documents and applicable regulatory requirements.
 7. List of other Work, if any, which may be affected by the proposed substitution.
 8. Availability of maintenance service and source of replacement materials.
 9. Name and address of similar projects on which the proposed substitute product was used. For each project, include name, address, and telephone numbers of the building owner and the architect and the date of installation.
 10. Sample of standard form of guarantee or warranty offered by the manufacturer for the substitute product proposed.
- B. Submit substitutions on the Request for Substitution (RFS) form attached at the end of this SECTION. Follow the request for information processing requirements.
- C. The Contractor will maintain a Request for Substitution log indicating the following: RFS number, description, the date submitted to the County, the date required for return, the date returned from the County, and comments. This log will be reviewed at the weekly progress meetings. County will respond to Request for Substitutions within twenty-one (21) days upon receipt of all information required to be provided by Contractor.

1.10 DOCUMENTATION

- A. The Contractor shall support its proposal with sufficient information, test data, certificates, samples, or other means to permit the County's making fair, equitable, and informed judgments.
- B. The burden of proof that a substitution is equal or otherwise acceptable shall be upon the Contractor. The County may withhold or refuse approval for reason of insufficient documentation. The County may also require additional tests and inspections for which cost the Contractor shall be responsible.
- C. Where agencies such as State Fire Marshal and Building Officials exercise jurisdiction over use of specific material or method, the Contractor shall submit certification of their approval of proposed substitution.

1.11 THE CONTRACTOR'S RESPONSIBILITY FOR ACCEPTED SUBSTITUTIONS

- A. Acceptance of any substitution shall not relieve the Contractor from responsibility for the proper execution of the Work and for complying with requirements of the Construction Documents.
- B. The Contractor shall be responsible for changes in other parts of the Work occasioned by its substitutions and shall bear their expense, including the cost of the County's additional services.

1.12 COUNTY'S REVIEW

- A. The Architect will review all requests for substitution for conformance with the Construction Documents. If the Architect deems the substitution does not conform to the County's program, the request will be denied. The Architect shall be the sole judge of whether the Contractor's proposed substitution is equal and shall make its judgment in accordance with the following criteria:
1. Whether substitution proposed conforms with description or performance specified;
 2. Whether substitution proposed is equal in quality and serviceability;
 3. Whether substitution proposed is comparable in appearance and artistic effect where these are considerations;
 4. Whether substitution proposed affords comparable operation, maintenance, and performance;
 5. Whether substitution proposed will provide equal longevity and service under conditions of climate and usage;
 6. Whether substitution proposed will fit into space allocated or operate from mechanical or electrical services provided without necessitating changes in details and construction of related Work; and
 7. Whether substitution proposed is otherwise in the County's interest, offering advantages in cost and time.
- B. A determination by the Architect that the Contractor's proposed substitution is not equivalent for any single characteristic, figure, or quality as described in the above is sufficient ground for rejection.
- C. If a proposed substitute product is not accepted, provide the product originally specified.

PART 2 – PRODUCTS - (Not Applicable)

PART 3 – EXECUTION - (Not Applicable)

END OF SECTION

REQUEST FOR SUBSTITUTION FORM

To: County of Monterey

Project: San Lucas Library

Specified or Indicated Product: _____

Specification Reference: Section _____ Page _____ Article/Paragraph _____

Drawing Reference: Sheet No. _____ Detail No. _____

The undersigned requests consideration of the following proposed substitute product:

Manufacture: _____

Product: _____

History: New product 2-5 years old 5-10 years old 10+ years old

The following factual and comparative data for the proposed substitute product are attached. It is understood that this substitution request may not be reviewed without adequate data to properly evaluate the request.

- Product Information with applicable portions clearly identified (check and list all that apply) :
 - Manufacturer's printed descriptive and technical product data.
 - Performance specifications.
 - Drawings
 - Photographs
 - Samples
 - Certified test results
 - Other _____
- Itemized feature-by-feature comparison of the proposed substitute product with the Indicated or Specified product.
- List of not less than three similar projects, located within a100-mile radius of the Project, where the proposed substitute product has been successfully installed. For each project, the following is included: Project Name, Date of Installation, and the name and telephone number of the Architect of Record.
- Detailed description of other Work that will be affected by the proposed substitute product including a description of changes that the proposed substitute product will require to be made to the Work for the proper installation of the proposed substitute product.
- Evaluation of the effect that the proposed substitute product will have on the construction progress schedule.
- Complete itemized cost data for the proposed substitute product indicating the amount to be deducted from the Stipulated Sum if the proposed substitute product is accepted.

REQUEST FOR SUBSTITUTION

The Undersigned certifies that:

- He or she has personally investigated the proposed substitute product and has determined that it is equal or superior in all respects to the indicated or specified product.
- The proposed substitute product is in full compliance with the requirements of the Construction Documents and applicable regulatory requirements and does not affect dimensions or functional clearances.
- He or she will furnish the same guarantees/warranties or bonds for the proposed substitute product as for the indicated or specified product.
- The proposed substitute product will have no adverse affect on other trades, will not adversely affect or delay the Progress Schedule, will not increase the Stipulated Sum, and will not require an increase in Contract Time.
- The same maintenance service and source of replacement parts, are available for the proposed substitute product as for the indicated or specified product.
- He/she will coordinate the installation of the proposed substitute product into the Work and will make such changes to other Work, as acceptable to Architect, as required for the Work to be complete in all respects.
- He/she will pay all additional costs caused by the proposed substitute product including, but not limited to, the costs of additional Work, the County's or Architect's additional services, and approvals of regulatory authorities.
- Attached cost data is complete and includes all related costs.
- Waives all claims for additional costs and time extensions related to proposed substitute product which may subsequently become apparent.

The Undersigned hereby requests acceptance of the above-named proposed substitute product and is bound to the requirements for substitutions in Specification SECTION 012500 "PRODUCT SUBSTITUTIONS ".

Signature of Contractor

Title

Date

END OF SUBSTITUTION REQUEST FORM

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SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project Web site.
 - 5. Project meetings.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Construction Manager, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 GENERAL COORDINATION PROCEDURES

- A. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- B. Conservation: Contractor to coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 COORDINATION DRAWINGS

- C. Coordination Drawings, General: Contractor to prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate required installation sequences.
 - f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- D. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. RFI number, numbered sequentially.
 6. RFI subject.
 7. Specification Section number and title and related paragraphs, as appropriate.
 8. Drawing number and detail references, as appropriate.
 9. Field dimensions and conditions, as appropriate.
 10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

1.7 PROJECT WEB SITE

- A. Use Construction Manager's Project Web site for purposes of hosting and managing project communication and documentation until Final Completion. Project Web site shall include the following functions:
1. Meeting minutes.
 2. Photo documentation.
 3. Schedule and calendar management.
 4. Submittals forms and logs.
- B. Provide up to seven Project Web site user licenses for use of the Owner, Construction Manager, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for Project Web site users.
- C. On completion of Project, provide one complete archive copy (ies) of Project Web site files to Owner and to Architect in a digital storage format acceptable to Architect.
- D. Provide one of the following Project Web site software packages under their current published licensing agreements:
1. Autodesk, Buzzsaw.
 2. Autodesk, Constructware.
 3. Dropbox
- E. Contractor, subcontractors, and other parties granted access by Contractor to Project Web site shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

1.8 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three days of the meeting.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Minutes: Construction Manager will be responsible for conducting meeting, will record and distribute meeting minutes.
- C. LEED Coordination Conference: Construction Manager will schedule and conduct a LEED coordination conference before starting construction, at a time convenient to Owner, Construction Manager, Architect, and Contractor.
1. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; Contractor and its superintendent and LEED coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- D. Progress Meetings: Construction Manager will conduct progress meetings at weekly intervals.
1. Contractor to coordinate dates of meetings with preparation of payment requests.

2. Attendees: In addition to representatives of Owner, Construction Manager, and Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Minutes: Construction Manager will be responsible for conducting meeting, will record and distribute meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Contractor to revise construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Preconstruction conference.
2. Weekly Contractor meetings.
3. Weekly coordination meetings.
4. Pre-installation conferences.

1.2 PRECONSTRUCTION CONFERENCE

A. Location

1. A preconstruction conference will be held at the work site.
2. Location, time, and date will be set by County Representative.

B. Contractor and major subcontractors shall attend the conference.

C. The meeting will be chaired, and minutes taken, by County Representative.

D. The subjects to be reviewed include, but are not limited to:

1. Introduction.
2. Construction Coordination.
3. Correspondence.
4. Submittals.
5. Permits.
6. Dust Control.
7. Schedule.
8. Survey Control.
9. Contractor's Representative.
10. Testing and Inspection.
11. Contractor Reporting Requirements.
12. Changes and Clarifications.
13. Clean-up.
14. As-Built Documents.
15. Prevailing Wage Requirements.
16. Environmental Protection, Plan and Procedures.
17. Temporary Facilities Construction.
18. Notice of Labor Disputes.
19. Progress Payments.
20. Site Regulations.
21. Security.
22. Operation and Maintenance Data.

- 23. Training Requirements.
- 24. General Discussion.

1.3 WEEKLY CONTRACTOR MEETINGS

- A. Once a week during the contract period, Contractor shall meet at the work site with the County Representative.
- B. Time and location of the meeting will be determined during the Preconstruction Conference.
- C. The County Representative will serve as chairman and take minutes of meetings.
- D. Topics for discussion will include schedule, requests for information, disputed items, Potential Change Order (PCO) and Change Order (CO) status, Quality control, submittals, exception notices, and other topics as required.

1.4 WEEKLY COORDINATION MEETINGS

- A. Once a week during the contract period, the Contractor along with the contractors for other Bid Packages shall meet at the work site with the County Representative.
- B. Time and location of the meetings will be determined by the County Representative.
- C. The County Representative will serve as chairman and take minutes of meetings.
- D. Topics for discussion will include upcoming closures, coordination of construction activities, and other topics of interest to all parties.

1.5 PREINSTALLATION CONFERENCES

- A. Convene a pre-installation conference for items of work contained in each Division of the Specifications, each trade within the Division, and each subcontractor within the Division.
 - 1. Convene a pre-installation conference prior to commencing the work of the Section, trade or subcontractor.
 - 2. Require attendance of each subcontractor and each trade directly affecting or affected by the work within the Division.
 - 3. Convene additional conferences when required by individual Section of the Specification.
 - 4. Prepare an agenda, preside over the conference, and record minutes, and distribute copies within two (2) days after the conference to participants, with two (2) copies to the County Representative.
 - 5. Review conditions of installation, coordination, preparation, approved submittals, contract documents, and means and methods planned to be used to perform the work.
- B. Within 45 days after Notice to Proceed, submit a proposed list of pre-installation conferences, and items of work to be covered, for approval by the County Representative.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

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SECTION 013300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DESCRIPTION

A. Timing:

1. Make submittals within the times specified herein. Do not submit all at one time. Submit in accordance with the sequence of procurement, fabrication and construction.
2. Make submittals far enough in advance of scheduled dates of installation to allow the time required for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

B. Related Documents:

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specification Sections, apply to this Section.

C. Definitions:

1. Action Submittals:

- a. Written and graphic information that requires the County's responsive action.
- b. Construction phase submittals are Information submittals except the following categories which are considered Action submittals:
 - 1) Materials requiring color choice approval by the County.
 - 2) Distinguishing architectural materials.
 - 3) Signage and way-finding graphics.
 - 4) Items indicated to be approved by the County.

2. Coordination:

- a. Coordinate preparation and processing of submittals with performance of construction activities.
- b. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
- c. Coordinate multidiscipline design phase submittals and construction documents prepared by Contractor.
- d. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - 1) The County reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Identification:

1. Identify each submittal and resubmittal with the following information:

- a. Project name and address as they appear on the Contract Documents
 - b. Contract name and number
 - c. Contractor's name and address
 - d. Date of submission
2. Identify each submittal with the following additional identification:
- a. Contractor's stamp with initials or signature, certifying to review of submittal, compliance with Contract Documents, and coordination with other impacted work, and verification of field measurements. The architect will return any submittal not bearing this stamp without being reviewed.
- E. Summary:
- 1. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
 - a. Submittal schedule
 - b. Submittal procedures
 - c. Daily construction reports
 - d. Shop Drawings
 - e. Product Data
 - f. Samples
 - g. Manufacturer's' instructions
 - h. Manufacturers' certificates
 - 2. Administrative Submittals: Refer to other Division - 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - a. Permits
 - b. Applications for payment
 - c. Performance and payment bond
 - d. Insurance certificates
 - e. List of subcontractors

1.2 SCHEDULES

- A. Submittal Schedule: Include submittal date and date required for return for each submittal required by the Contract Documents. No action will be taken on such submittals without prior receipt, review, and acceptance of Submittal Schedule.
- 1. Prepare a complete schedule of submittals. Submit within 14 calendar days after Notice to Proceed.
 - 2. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
 - 3. Prepare the schedule in chronological order. Provide the following information:
 - a. Scheduled date for the first submittal
 - b. Related Section number
 - c. Event Number associated with CPM Construction Schedule
 - d. Submittal category
 - e. Name of Subcontractor
 - f. Description of the part of the Work covered

- g. Scheduled date for re-submittal
- B. Distribution: Following response to initial submittal schedule, print and distribute 3 copies to the County Representative.
 - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.
- D. Instruct recipients to report promptly any problems anticipated by dates or sequences shown in schedule.

1.3 SUBMITTALS PROCEDURES

- A. Coordinate preparation and processing submittals with performance of construction activities.
 - 1. Make submittals in groups containing associate items to ensure that information is available for checking each item when received.
 - a. Partial submittals may be rejected as not complying with requirements of Contract documents and Contractor shall be liable for any resulting delays.
 - 2. Requests for deviation from Contract Documents shall be submitted for consideration before submittal of affected items. Only deviations, which have been previously accepted in writing, shall be included in submittals.
- B. Place permanent label or title block on each submittal for identification. Indicate name or entity preparing each submittal in label or title block. See Paragraph 1.01.C herein for further information requirements on each submittal label or title block.
 - 1. Provide space on label or beside title block to record Contractor's and Architect's review and approval markings and action taken.
- C. Contractor's Review:
 - 1. Review submittals for accuracy, completeness, and conformity with Contract Documents.
 - a. Submittal shall be construed as stipulating Contractor has thoroughly and completely reviewed, and coordinated data.
 - b. Submittals that indicate less than Contractor's full compliance will be returned without action.
 - c. Delays caused by failure to comply will not be acceptable basis for extension of Completion Time.
- D. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals.
- E. Package each submittal appropriately for transmittal and handling.

- G. Review shall not relieve Contractor from responsibility for errors or deviations from requirements of Contract Documents.
- H. Submittal Log: Maintain accurate submittal log for duration of Contract. Indicate current status of all submittals at all times. Make submittal log available for the County Representative's review upon request.
- I. Re-submittals:
 - 1. Subject to same terms and conditions as original submittal.
 - 2. Architect will accept not more than one re-submittal.
 - a. Should additional re-submittals be required, Contractor shall reimburse County for Architect's account for time spent in processing additional re-submittals at rate of 2.5 times rate of Direct Personnel Expense (DPE). Direct Personnel Expense is defined as direct salaries of Master Architect's personnel engaged on Project and portion of costs of mandatory, and customary contributions and benefits related thereto, including employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.
 - 3. Claims will not be considered for Contractor's additional time or expense associated with re-submittals.

1.4 SUBMITTAL CLASSIFICATIONS

- A. General:
 - 1. Submittals for the Project are classified as follows:
 - a. Project Proposal submittals. For requirements for these submittals, refer to the Proposal Requirements.
 - b. System confirmation and Basis of Design Phase submittals.
 - c. Construction documents – Design Phase submittals.
 - d. Construction submittals.
 - e. Project closeout submittals.
 - f. Commissioning Submittals.

1.5 PATTERNS AND COLORS

- A. Unless the exact pattern and color of a product are indicated in the Contract Documents, whenever a choice of pattern or color is available for a product, submit accurate color charts and pattern charts to the County for selection.
- B. Samples:
 - 1. Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 - 2. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 3. Disposal: Maintain sets of approved Samples at Project site, available for quality-

control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptable of construction associated with each set.

4. Samples of Verification:
 - a. Submit full-size units or Samples of size required, prepared from same material to be used for the work, cured and finished in manner specified, and physically identical with material or project proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; shall cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - b. Number of Samples: Submit for sets of Samples. The County will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

1.6 PROJECT CLOSEOUT SUBMITTALS

- A. General:
 1. Comply with requirements specified in Division 1, Closeout Procedures, Operation and Maintenance Data, Project Record Documents, and Commissioning Requirements.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- D. The County Representative and the Master Architect will retain the certificates of compliance; no review reply is intended.

1.7 REQUIREMENTS FOR EACH SUBMITTAL CATEGORY

- A. Product Schedule or List:
 1. As required in individual Specification sections, prepare a written summary indicating types of products required for the work and their intended location. Include the following information in tabular form:
 - a. Type of product. Include unique identifier for each project.
 - b. Number and name of room or space.
 - c. Location within room or space.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 013323

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Definitions.
 - 2. Shop drawings.
 - 3. Product Data.
 - 4. Samples.
- B. Related Sections and Documents
 - 1. Refer to requirements of Division 0.
 - 2. Section 01 33 00 - Submittals.

1.2 DEFINITIONS

- A. Manufactured: Standard units usually mass-produced.
- B. Fabricated: Specifically assembled or made out of selected materials to meet design requirements.
- C. Shop Drawings: Documents establishing the actual detail of manufactured or fabricated items, indicating relation to adjoining work, identifying what work is performed at the project site, and amplifying design details of mechanical and electrical equipment in proper relation to physical spaces in the structure.
- D. Product Data: Manufacturer's standard drawings, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, other drawings and descriptive data pertaining to specified products.

1.3 SHOP DRAWINGS

- A. Submit under provisions of Section 01 33 00.
- B. Submit one reproducible transparency and eight opaque reproductions. The reproducible copy will be returned after review.
- C. Reproductions of Contract Drawings, Specifications, or portions thereof shall not be used for shop drawing submittals.
- D. Present information in clear and thorough manner.
- E. Identify details by reference to Drawing and detail, schedule, or room numbers shown and specified.

1.4 PRODUCT DATA

- A. Submit under provisions of Section 01 33 00.
- B. Clearly mark each copy to identify pertinent products and models.
 - 1. Modify to delete inapplicable information.
 - 2. Supplement standard information as required.
- C. Indicate performance characteristics and capacities.
- D. Show dimensions and clearances required.
- E. Show wiring, piping diagrams, and controls.

1.5 SAMPLES

- A. Submit under provisions of Section 01 33 00.
- B. Submit the number of samples indicated in each Section. Where no number is indicated, submit 9 samples.
- C. Submit samples of sufficient size to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Submit samples of finishes from the full range of manufacturer's standard colors, custom colors when specified, textures and patterns for selection.
- E. Include identification on each sample with full project information.
- F. Reviewed samples which may be used in the work are indicated in individual specification Sections.
 - 1. Only samples marked "No Exception Taken" may be incorporated in the work.
 - 2. Samples that were intended to be incorporated in the work will be returned, together with a written notice designating the sample with the appropriate review status and indicating errors discovered on review.
 - 3. Other samples will not be returned, but the same notice will be given, and such notice shall be considered a return of the sample.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

SECTION 013553

SECURITY PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Definitions.
 - 2. Work hours.
 - 3. Materials and Equipment.
 - 4. Utility Outages and Interruptions.
- B. Related Documents and Sections
 - 1. Refer to requirements of Division 0.
 - 2. Section 01 11 00 - Summary of Work: Use of premises.

1.2 DEFINITIONS

- A. Construction Personnel: Any individual person, employed directly or indirectly by the Contractor to perform work or provide services in connection with the Work of this Contract.
- B. Employee: For purposes of this Section, an employee is any individual person, employed directly or indirectly by the Contractor to perform work or provide services in connection with the Work of this Contract.
- C. Institutional Holidays: Below are institutional holidays observed by the County in current year and for future years. Each year's holiday schedule will be available no later than January 1st of each year. Contractor may request a schedule at that time.

New Years Day/Eve
Martin Luther King Day
President's Day
Cesar Chavez Day
Memorial Day
Independence Day

Labor Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day/Eve

- D. Normal Work Hours: 8:00 a.m. to 5:00 p.m. Monday through Friday, excluding Holidays.

1.3 WORK HOURS

- A. Perform work only during normal work hours, unless otherwise approved by County Representative.
- B. Furnish to County Representative, a directory of all worksite and emergency contact telephone numbers for the Contractor and all subcontractors.

1.4 MATERIALS AND EQUIPMENT

A. Tools:

1. Storage:
 - a. Provide appropriate secure storage for hazardous or toxic materials.
 - b. Storage containers and locations shall be approved by County Representative.
 - c. Provide contact person and telephone number, with 24-hour availability, for access to equipment lockers.

1.5 UTILITY OUTAGES AND INTERRUPTIONS

A. Utility interruptions will not be allowed without prior approval of County Representative.

1. Contractor shall consult with County representative prior to excavating any manholes.
2. Provide 48-hour written notice of utility interruptions of less than 8 hours duration. Provide 10 calendar days written notice of interruptions 8 hours or longer duration. Approval request shall be in the format directed by the County Representative.
3. Shutdowns and tie-ins taking longer than 8 hours may only occur on weekends between midnight Friday and midnight Sunday.
4. Plan the work so that all work possible is completed prior to shutdown to minimize outage period.
5. Maintain utilities on which the Contractor is doing work in operating order until approval is granted for shutdown.
6. In the event some unforeseen occurrence caused by Contractor interrupts utility service, Contractor shall remain onsite actively making repairs until service is restored.
7. Contractor shall plan work activity so that material and equipment are available in the Contractor's laydown area to perform emergency repairs.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

SECTION 014216

REFERENCES

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION includes abbreviations and acronyms, definitions, and reference standards used in the Construction Documents.
- B. Refer to the CONTRACT REQUIREMENTS and other Construction Documents for further information.

1.2 ABBREVIATIONS AND ACRONYMS

- A. The following abbreviations and acronyms may be used in the Contract Documents. Refer uncertainties to the Contractor for a decision before proceeding.

AA	Aluminum Association
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAIEE	American Association of Electrical and Electronics Engineers
AAMA	Architectural Aluminum Manufacturers' Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AFI	Air Filter Institute
AFPA	American Forest and Paper Association
AIA	American Institute of Architects
AIMA	Acoustical and Insulation Materials Association
AISC	American Institute of Steel Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	The Engineered Wood Association (formerly the American Plywood Association)

ARI	Air Conditioning and Refrigeration Institute
ASA	American Standards Association
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWWA	American Water Works Association
AWS	American Welding Society
BHMA	Builders Hardware Manufacturers' Association
BIA	Brick Institute of America
CAL/OSHA	State of California Construction Safety Orders
CALTRANS	State of California, Business and Transportation Agency, Department of Transportation, "Standard Specifications"
CBC	California Building Code
CCR	California Code of Regulations
CDA	Copper Development Association
CISCA	Ceilings and Interior Systems Construction Association
CFFA	Chemical Fabrics and Film Association, Inc.
CFMG	Cabinet and Fixture Manufacturers Guild
CLFMI	Chain Link Fence Manufacturers' Institute
CPA	Composite Panel Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CPSC	United States Consumer Products Safety Commission
CS	Commercial Standard, United States Department of Commerce
CSA	Canadian Standards Association
DASMA	Door and Access Systems Manufacturers Association International

EIMA	EIFS Industry Members Association
EPA	Environmental Protection Agency
ESO	Electrical Safety Orders
FAA	Federal Aviation Administration, United States Department of Transportation
FCC	Federal Communications Commission
FGMA	Flat Glass Marketing Association (now GANA)
FM	Factory Mutual System, Factory Mutual Engineering Corporation
FS	Federal Specification Unit
GA	Gypsum Association
GANA	Glass Association of North America
GRI	Geosynthetic Research Institute
GTA	Glass Tempering Association (now GANA)
HMA	Hardwood Manufacturers Association
HPMA	Hardwood Plywood Manufacturers Association
HPVA	Hardwood Plywood and Veneer Association
HUD	United States Department of Housing and Urban Development
IBR	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineers Society
IGCC	Insulating Glass Certification Council
ITS-WH	Intertek Testing Service - Warnock Hersey
LSGA	Laminator's Safety Glass Association
MIA	Marble Institute of America or the Masonry Institute of America
MIL	Military Standardization Document, United States Department of Defense
MIW	Masonry Institute of Washington
ML/SFA	Metal Lath/Steel Framing Association

MM	“Materials Manual”, State of California, Business and Transportation Agency, Department of Transportation
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NBGQA	National Building Granite Quarries Association, Inc.
NBS	National Bureau of Standards (now the NIST)
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electric Manufacturers' Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association (now the AFPA)
NFRC	National Fenestration Rating Council
NHLA	National Hardwood Lumber Association
NICET	National Institute for Certification in Engineering Technologies
NIST	National Institute of Standards and Technology, United States Department of Commerce (formerly the National Bureau of Standards)
NOAA	National Oceanic and Atmospheric Administration
NOFMA	National Oak Flooring Manufacturers Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	NSF International (formerly National Sanitary Foundation)
NTMA	National Terrazzo and Mosaic Association
OSA	Office of the State Architect, State of California
OSHA	Occupational Safety and Health Administration
OSHPD	Office of Statewide Health Planning and Development, State of California
PCI	Precast / Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute

PEI	Porcelain Enamel Institute
PS	Product Standard, United States Department of Commerce
SDI	Steel Deck Institute or the Steel Door Institute
SFM	Office of State Fire Marshal, State of California
SIGMA	Sealed Insulated Glass Manufacturer's Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Society for Protective Coatings (formerly Steel Structures Painting Council)
SWI	Steel Window Institute
TCA	Tile Council of America
UL	Underwriters Laboratories, Inc.
USPS	United States Postal Service
USS	United States Standard
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Window and Door Manufacturers Association (formerly the National Wood Window and Door Association)
WIC	Woodwork Institute of California
WLPDIA	Western Lath Plaster /Drywall Industries Association (now the WWCCA)
WWCCA	Western Wall & Ceiling Contractors Association
WWPA	Woven Wire Products Association or Western Wood Products Association

- B. For other acronyms, and for addresses and telephone number of the associations, societies, and institutes refer to "Sources of Construction Information" published by, and available from the Construction Specification Institute, 601 Madison Street, Alexandria, VA 22314-1791, (703) 684-0300.

1.3 ADDITIONAL DEFINITIONS

- A. In addition to the terms defined in Article 1 and other portions of the CONTRACT REQUIREMENTS, the following terms are used in the Construction Documents and are defined as follows:

<u>Term</u>	<u>Meaning</u>
Acceptance, Accepted	As accepted by the County. No implied meaning shall be interpreted to extend the County's responsibility into the Contractor's requirements and Contract obligations.
Accepted Equal	As accepted by the County as being of equivalent quality, utility, and appearance.
Addenda	Written or graphic instruments issued by the County prior to the execution of the Contract which modify or interpret the Contract Documents by additions, deletions, clarifications, or corrections.
Approved	As approved by the County. No implied meaning shall be interpreted to extend the County's responsibility into the requirements and Contract obligations.
By County	Work on this Project that will be performed by the County or its agents, at the County's cost.
By Others	Work on this Project that is outside the scope of Work to be performed by the Contractor under this Contract, but that will be performed by the County, other contractors, or other means.
Concealed	Embedded in masonry, concrete or other construction, installed within furred spaces, within a wall/partitions or above suspended ceilings, in trenches, in crawl spaces, or in enclosures.
Construction Inspectors	Individuals employed or retained by the County to review the construction for code compliance and quality standards.
Contract Requirements	Contract requirements of the Contract Documents.
Consultant	A consultant to the County.
County-Furnished	The County will furnish at its cost and the Contractor shall install under this Contract.

Directed	Directed by the County.
Equipment	Product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
Exposed	Not installed underground or concealed as defined above.
Fabricated	Items specifically assembled or made out of selected materials to meet individual design requirements for the Project.
Furnish (product)	Supply and deliver to the Project Site ready for installation and in operable condition. Do not install.
Include, Including	Include/including, without limitation.
Indicated, Shown, Detailed	As shown and/or noted on the Drawings.
Install (services or labor)	Place in final position, complete, anchored, connected, and in operable condition. Do not furnish.
Manufactured	Applies to standard units usually mass-produced.
Manufacturer's directions, instructions, recommendations, or specifications	Manufacturer's written directions, instruction, recommendations, or specifications.
Product	New material, machinery, component, system, fixture, equipment, and terms of similar intent.
Product Data	Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a portion of the Work.
Project	The total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the County or by separate contractors.
Project Site, Site	Geographical location of the Project.
Project Manual	The Project Manual is a volume or volumes assembled for the Work that includes the Contract Requirements and Specifications.

Provide	Supply, fabricate, deliver, place, and connect, complete in-place, ready for operation and use. When neither furnish, install nor provide is stated, provide is implied.
Required Samples	Required by the Contract Documents. Physical examples illustrating materials, equipment or workmanship, and establish standards by which the Work will be judged.
Selected	As selected by the County. No implied meaning shall be interpreted to extend the County's responsibility into the Contractor's requirements and Contract obligations.
Shall	Means a mandatory requirement.
Specifications	Portions of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards, and workmanship for the Work and performance of related services.
Specified	As written in the Specifications.
Subcontractor	Person or entity who has a direct contract with the Contractor to perform a portion of the Work.
Submit, Submittal,	Submit to the County for review, unless otherwise specified.

B. Additional abbreviations, used on the Drawings, are listed and defined thereon.

1.4 REFERENCE STANDARDS

A. Specified standards of the construction industry shall have the same force and effect on the performance of the Work as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.

- B. When codes, reference standards and specifications published by technical societies, institutions, associations and governmental agencies, such as CBC, ASTM, ANSI, FS and the like are referenced in the Contract Documents, the applicable edition shall be the date in effect at the time of agency approval for said Work. Contractor shall verify the requirements of all applicable governmental agencies and coordinate the timing of required submittals, design approvals, and construction activities accordingly. For portions of Work not governed by agency approval, the latest edition of standards adopted within thirty days of the Contractor's Proposal shall apply.
- C. No provisions of any referenced standards or specifications, whether or not specifically incorporated by reference in the Contract Documents, shall be effective to change the duties and responsibilities of the County, Contractor, subcontractors, or any of their consultants, agents or employees from those set forth in the Contract Documents.
- D. Unless the Contract Documents Indicate Otherwise:
1. Where conflict exists between referenced documents and Contract Documents, or between referenced documents, the one having more stringent requirements shall apply. Refer uncertainties as to which quality level is more stringent to the County for a decision before proceeding with the affected Work, including preparation of submittals.
 2. Refer requirements that are different but apparently equal to the County for a decision before proceeding with the affected Work, including preparation of submittals.
 3. Each entity engaged in construction on the Project shall be required to be familiar with industry standards applicable to that entity's construction activity.

END OF SECTION

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SECTION 014500
QUALITY CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes general requirements for quality control of the Work including requirements for testing and inspection.. This SECTION does not supersede more stringent requirements specified elsewhere in the Construction Documents or CONTRACT REQUIREMENTS.
- B. Refer to SECTION 014531 “WATERPROOFING AND ROOFING INSPECTION SERVICES” for waterproofing and roofing inspection requirements.
- C. Contractor shall employ and pay for an approved Testing Laboratory to make tests demonstrating material compliance with the Specifications and to prepare mix designs for concrete.
- D. The Contractor shall hire a special roofing and waterproofing inspection service approved by the County as specified in SECTION 014531 “WATERPROOFING AND ROOFING INSPECTION SERVICES” to inspect and monitor all applications of waterproofing, roofing, and related flashings.
- E. Contractor's employment of the Testing Laboratory shall in no way relieve the Contractor of his obligations to perform the Work in accordance with Construction Documents and CONTRACT REQUIREMENTS.
- F. The Contractor will have the right to have tests and inspections performed on any material at any time for his own information and job control so long as the County does not assume responsibility for costs or for giving them consideration when appraising quality of materials.
- G. Specific test procedures to be performed in compliance with this SECTION are specified in applicable SECTIONS in Divisions 2 through 33 of these Specifications.

1.2 INSPECTION SERVICES

- A. The County will employ building inspector(s) to serve as Construction Inspector(s).
- B. Cooperate with Construction Inspector and other inspectors. Provide access to the Work at all times whether it is in preparation or progress. Provide proper facilities for access and inspection.
- C. Do not perform Work without the direct knowledge of the Construction Inspector. Cover no Work prior to inspection.
- D. Notify Construction Inspector in writing at least 48 hours prior to expected time for operations requiring inspection.

1.3 SUBMITTALS

- A. Report Matrix: Prepare and submit for approval by the county a matrix that describes types of reports, number of copies for each type, and distribution requirements.
- B. Daily Reports: As specified hereinafter.
- C. Test and Inspection Reports: As specified hereinafter.

1.4 DEFINITIONS AND QUALIFICATIONS

1. Testing Laboratory or

Testing Agency: Certified as meeting the requirements of ASTM D3666, ASTM E329, ASTM E543 and ASTM E548, as applicable to the tests and inspections performed, approved by the County and OSHA, and referred to hereafter as the Testing Laboratory. Additional qualifications are specified in SECTION 014531 "WATERPROOFING AND ROOFING INSPECTION SERVICES", as applicable to that SECTION.

2. Geotechnical Engineer: California registered professional geotechnical engineer.

3. Disqualified Material: Any material shipped or delivered to the Site by the Contractor from the source of supply prior to having satisfactorily passed the required test and inspection, or prior to the receipt of a notice from the County that such test and inspection will not be required, shall not be incorporated in the Work.

1.5 CONTRACTOR'S QUALITY CONTROL SYSTEM

- A. Establish a quality control system to perform sufficient inspections and tests of all items of Work, including that of all Subcontractors, to ensure compliance with the Construction Documents for materials, workmanship, construction, finish, functional performance, and identification.
- B. Quality control system shall ensure that the Work complies with the requirements of the Construction Documents and CONTRACT REQUIREMENTS. Controls shall be adequate to cover all construction operations.

1.6 DAILY REPORTS

- A. Reports shall be a factual description of the status of the Work and contain, as minimum information, the location and description of the Work being performed, coordination or schedule problems, discrepancies noted in the Drawings and/or Specifications, requests for information, the Contractor's man count by craft, and material and equipment delivered to the Site.
- B. Reports shall be signed by a responsible member of the Contractor's staff.
- C. Furnish reports in accordance with County Representative's established procedures.

1.7 FIELD SAMPLES

- A. Furnish and install field samples for review at the Site as required by individual Specification SECTIONS.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Specification SECTIONS to be removed, do so only after field sample has been accepted by the County.

1.8 MOCK-UPS

- A. Provide, assemble, and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- B. Where mock-ups are specified to be removed, clear area after mock-up has been accepted by County, and approved by the County for removal.

1.9 GENERAL QUALITY CONTROL REQUIREMENTS

- A. Materials to be furnished under the Contract are subject to test and inspection for compliance with the Construction Documents.
- B. Testing required by the Construction Documents shall be performed under the supervision and control of California-licensed professional engineers.
- C. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, adjusted, and conditioned in compliance with their manufacturer's latest published instructions, unless more restrictive or stringent requirements are specified.
- D. When specified or requested, furnish copies of such printed instructions to the prior to introduction of such items.
 - 1. If product manufacturer's instructions are in conflict with the Construction Documents, notify the County Representative for clarification before proceeding.
 - 2. Keep a copy of the various product manufacturers instructions applicable to the Work at the Site.
- E. Certifications:
 - 1. When specified, deliver to the County Representative two (2) signed certificates from suppliers of materials, equipment and manufactured items stating that such materials and manufactured items meet or exceed the standards specified.
 - 2. In lieu of such certification, the Contractor may submit reports of current tests made and attested by a reputable and recognized Testing Laboratory.

- F. None of the firms or individuals performing tests and inspections are authorized to accept or reject any Work, to modify any Construction Document requirement, to advise or instruct Contractor as to prosecution of the Work, or to perform any duty or service for the Contractor. Inspections shall not relieve the Contractor of the obligation to fulfill all requirements of the Construction Documents.

1.10 TESTING LABORATORY'S RESPONSIBILITIES

- A. Cooperate with Contractor, County, Construction Inspector, and other in performance of its services. Furnish qualified personnel promptly upon notice.
- B. Perform inspection, sampling, and testing of materials, products, mixes, and installations in accordance with standards indicated or specified.
- C. Ascertain compliance of products, materials, mixes, and installations with requirements of Construction Documents.
- D. Promptly notify the Contractor and County Representative of observed irregularities and deficiencies and of non-compliance with requirements of the Construction Documents.
- E. Reports:
 - 1. Prepare written reports for the County, building authorities, Construction Inspector, Contractor, and others as required. Promptly process and distribute required copies of reports and related instructions to assure necessary retesting and replacement of materials with the least possible delay in progress of the Work.
 - 2. Reports shall include the date issued and date of test, Project title and number, Testing Laboratory's name and address, name and signature of inspector, date of inspection or sampling, record of temperature and weather, identification of product and Specification SECTION, location in Project, type of inspection or test, and observation regarding compliance with Construction Documents.
- F. When requested, furnish written interpretation of test results, evaluation of analysis of cause (in event of test failure), and recommendations for remedial action.
- G. Perform additional inspections and tests required by the Contractor or County. Costs of additional testing that shows Contractor's non-compliance with the requirements of the Contract Documents shall be paid for by the Contractor.
- H. Maintain testing equipment that is calibrated at reasonable intervals with devices of an accuracy traceable to either NIST standards or accepted values of natural physical constants.

1.11 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with individuals and firms performing required inspections, tests and similar services and furnish reasonable auxiliary services as requested.
- B. Coordinate and provide tests and inspections required by Construction Documents and public authorities having jurisdiction over the Work. When changes of schedule are necessary during construction, coordinate all such changes accordingly.

- C. Notify the Testing Laboratory sufficiently in advance of the manufacture of materials to be supplied which, by requirements of the Construction Documents, must be tested at the source of supply so that the Laboratory may arrange for testing.
- D. Provide access, facilities, tools, and incidental labor necessary for duties to be performed at the Site by individuals and firms including furnishing ladders, hoisting, lighting, water supply, and similar services.
- E. Provide and maintain, for the sole use of the Testing Laboratory, adequate facilities for the safe storage and proper curing of test samples and test equipment on Site. Comply with requirements of ASTM C31 for concrete test cylinders, unless otherwise specified.
- F. Furnish and deliver adequate quantities of samples of materials to be tested at no cost to County. Test samples will be selected by the firm(s) or individual performing the tests and inspections.
- G. Furnish access to the Contractor's submittal records for review by Testing Laboratory personnel at the Site.
- H. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies including deficiencies in visual qualities of exposed finishes.
- I. Arrange and pay for additional inspections, tests, reports, and similar services as required when original inspections, tests, reports, and similar services indicate that Work is unsatisfactory and do not indicate compliance with the requirements of the Construction Documents.
- J. Correct deficiencies indicated in the reports in compliance with the requirements of the Construction Documents.
- K. Records:
 - 1. Maintain correct records on an appropriate form for all inspections and tests performed, instructions received from the County Representative and Testing Laboratory, and actions taken as a result of those instructions.
 - 2. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken.
 - 3. Document inspections and tests as required by each SECTION of the Specifications.

1.12 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Testing Laboratory may not release, revoke, alter, or enlarge on the requirements of the Construction Documents.
- B. Testing Laboratory may not approve or accept any portion of the Work.
- C. Testing Laboratory may not perform or assume any duties of the Contractor or a Subcontractor or supplier.
- D. Testing Laboratory may not stop the Work.
- E. Testing Laboratory has no authority to authorize additional Work.

1.13 COORDINATION OF TESTS AND INSPECTIONS

- A. Schedule, initiate and coordinate tests and inspections required by the Construction Documents and public authorities having jurisdiction over the Work.
- B. Notify the firm(s) or individuals, who will perform the tests and inspections, a sufficient time in advance of the manufacture of materials required to be tested at the source of supply so that the Testing Laboratory may arrange for testing. Proceed in the same manner for tests to be performed at the Site.

1.14 TEST PROCEDURES

- A. Tests shall be performed according to methods of test specified in these Specifications.
- B. If no procedure or test method is specified, testing shall conform to material specification referenced unless otherwise directed by County Representative.
- C. Firm or individual performing the test shall tag, seal, label, record, or otherwise suitably identify the materials for testing. No such materials shall be used in the Work until the test reports are submitted and approved, except materials specified to be placed or installed prior to testing.
- D. Retesting:
 - 1. Applicable tests shall be repeated at specified intervals whenever the source of supply is changed, whenever the characteristics of the materials change or vary during the course of construction, and when unsatisfactory test results are received.
 - 2. Additional testing shall be performed in the presence of the County Representative.

1.15 TEST COSTS

- A. Contractor shall arrange and pay for materials qualification and conformance tests, concrete and masonry mix designs, and other tests and inspections to be performed at the Site as described in the Construction Documents.

- B. County will have the right to require the Contractor to modify, change, or correct anything found not in compliance with the Construction Documents as a result of the findings by the Construction Inspector, inspection service, or Testing Laboratory.
- C. Even though not required by public agencies or the Construction Documents, the County Representative may request that materials be tested at no additional cost to the County.
- D. Contractor shall reimburse the County for all or any part, as the County may deem just and proper, costs incurred by the County due to the following:
 - 1. Failure of materials to pass initial tests.
 - 2. Failure to complete the Work within the Contract Time, and any previously authorized extensions thereof.
 - 3. Claims between separate contractors.
 - 4. Covering of Work before the required inspections or tests are performed.
 - 5. Contractor's correction of defective Work.
 - 6. Overtime costs for acceleration of Work done for Contractor's convenience.

1.16 TEST REPORTS

- A. Submit daily written reports to the County Representative. Quantities and other distribution of reports shall be in accordance with approved submittal matrix specified hereinbefore.
- B. Reports shall include the following:
 - 1. Date issued and date of test.
 - 2. Project title and number.
 - 3. Name and address of firm responsible for performing test and inspection.
 - 4. Name and signature of individual performing test and inspection.
 - 5. Date of inspection and sampling.
 - 6. Record of temperature and weather.
 - 7. Identification of product and Specification SECTION where test is specified.
 - 8. Location on Project.
 - 9. Type of inspection and test.
 - 10. Observation regarding compliance with the Construction Documents.

1.17 CONTRACTOR'S RECORDS

- A. Maintain accurate, current records on an appropriate form for all inspections and tests performed, instructions received from the County Representative, firm or individual performing test, and actions taken as a result of those instructions.
- B. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken.
- C. Document inspections and tests as required by each Specification SECTION.

1.18 APPROVAL REQUIRED BY OTHERS

- A. If laws, ordinances, rules, regulations or orders of public agency having jurisdiction require Work to be inspected, tested or approved by some authority other than the County or Contractor, the Contractor shall give required notices and make arrangements, deliver to the County Representative the certificates of inspection, test, or approval of such public agency, and pay all associated costs unless otherwise provided in the Construction Documents.

1.19 VERIFICATION OF CONDITIONS

- A. Prior to installation of any product, inspect existing conditions to receive materials to be installed and arrange for correction of defects in the existing workmanship, material or conditions that may adversely affect Work to be installed.
- B. Installation of materials shall constitute acceptance of existing conditions as being in proper condition to receive the materials to be applied and waiver of claim that existing conditions are defective as pertains to warranty requirements.
- C. Where the Construction Documents require a material to be installed under the supervision or inspection of the material manufacturer or his/her representative, manufacturer or his/her representative shall also inspect the Work in place and issue a letter of approval to the .

1.20 INSTALLER'S QUALIFICATIONS

- A. Where the Construction Documents require a certain level of experience or expertise from the manufacturer/installer by requiring a minimum number of years of experience in the successful installation of a product or a minimum number of successful installations for the product specified, it shall be the Contractor's responsibility to verify the installer's competence and track record before signing a subcontract to perform the affected Work.

1.21 MANUFACTURER'S FIELD SERVICES

- A. An experienced, competent, and authorized representative of the manufacturer of each item of equipment for which field services are required in the Specification SECTIONS shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.
- B. In each case, the representative shall revisit the Site as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of the County.

- C. Each manufacturer's representative shall furnish to the County Representative a written report certifying that the equipment has been properly installed, and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.
- D. All costs for these services shall be included in the Contractor's proposal.

1.22 SCHEDULE OF TESTS AND CERTIFICATIONS

- A. Test Certificates to be Furnished by the Contractor:
 - 1. Identification and mill tests of reinforcing steel.
 - 2. Certifications of materials, welders, etc.
 - 3. As indicated and as specified.
- B. Tests:
 - 1. Soils:
 - a. Test and analyze fill and backfill materials.
 - b. Test compaction of fill and backfill materials.
 - c. Inspect bearing surfaces of foundation excavation.
 - d. Test compaction trench backfill.
 - e. Test compaction aggregate under asphalt concrete paving.
 - f. Test compaction aggregate under Site concrete.
 - 2. Asphalt Concrete:
 - a. Test asphalt.
 - b. Test compaction of asphalt.
 - 3. Concrete:
 - a. Test identified reinforcing steel.
 - b. Test cement.
 - c. Test aggregate for suitability.
 - d. Review concrete mix design.
 - e. Perform continuous batch plant inspection.
 - f. Test concrete for air content.
 - g. Inspect concrete placement.

- h. Perform shrinkage tests.
- i. Make slump tests.
- j. Cast compression test cylinders. Test cylinders at 7 and 28 days.
- k. Post-tensioning:
 - 1) Continual post-tension inspections.
 - 2) Test identified strands.
- 4. Structural Steel:
 - a. Review mill certificates for shapes and plates.
 - b. Visually inspect shop and field welding.
 - c. Test full penetration welds.
- 5. Metal Fabrications:
 - a. Visually inspect shop and field welding.
 - b. Test full penetration welds.
- 6. Exterior and Interior Stone:
 - a. Modulus of rupture, flexure, and other tests.
 - b. Accelerated aging tests.
 - c. Production testing.
- 7. Fireproofing:
 - a. Test fireproofing.
 - b. Test thickness and density.
- 8. Other: As indicated and as specified.

1.23 RETESTING

- A. The County will have the right to order additional tests if the County has reasonable doubt that materials or products comply with the requirements of the Construction Documents and CONTRACT REQUIREMENTS.
- B. Should the County require tests or inspections, furnish necessary facilities, labor, and materials to uncover or remove Work in question to the extent necessary.
 - 1. If additional tests or inspections establish that materials comply with the requirements of the Construction Documents, costs for such tests and additional Work will be paid by the County. Reasonable time extension shall be granted.

2. If additional tests or inspections establish that materials do not comply with the requirements of the Construction Documents, costs for such tests and additional Work shall be paid by the Contractor. Time extension may not be granted.

END OF SECTION

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SECTION 014529

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Description.
 - 2. Quality Assurance.
 - 3. Laboratory Duties.

1.2 DESCRIPTION

- A. Employ and pay for the services of one or more Independent Testing Laboratories to perform specified testing.

1.3 QUALITY ASSURANCE

- A. Proposed testing laboratory shall be acceptable to the County Representative.
- B. Reference Standards: Indicated in individual Sections.

1.4 LABORATORY DUTIES

- A. Perform specified sampling and testing of materials.
 - 1. Comply with specified standards.
 - a. Ascertain compliance of materials with requirements of the Contract.
- B. Promptly notify County Representative and the Contractor of observed irregularities and deficiencies in the work and in products to be used in the work.
- C. Promptly submit written report of each test; two copies to County Representative
- D. Each report shall include:
 - 1. Date Issued.
 - 2. Project title and number.
 - 3. Testing Laboratory name, address, and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling and testing.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and Specification Section.
 - 9. Location of sample or test in the project.
 - 10. Type of test.
 - 11. Results of tests and compliance with the Contract.
 - 12. Interpretation of test results when requested by County Representative.
- E. Retesting required because of nonconformance to specified requirements shall be performed

by the same Testing Laboratory.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

SECTION 014531

WATERPROOFING AND ROOFING INSPECTION SERVICES

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes the requirements for providing County-approved waterproofing and roofing inspection services for:
 - 1. Installation of all types of waterproofing.
 - 2. Installation of all types of roofing.
 - 3. Installation of related flashings.
 - 4. All penetrations of all waterproofing, roofing, and flashings.
- B. County shall have the right to require the Contractor to modify, change, or correct anything found not to be installed properly as a result of the findings by the inspection service.

1.2 DEFINITIONS

- A. In connection with installation, the phrase "unacceptable methods or unacceptable results" mean methods and results other than:
 - 1. Those required by the materials manufacturers.
 - 2. Those required by the pertinent regulations of governmental agencies having jurisdiction.
 - 3. Those required by the Contract Documents.
 - 4. Those agreed to in the pre-installation meetings.

1.3 SUBMITTALS

- A. Lists of Attendees: Submit pre-installation meeting attendance lists to the County as specified herein.
- B. Reports:
 - 1. Submit daily reports to the County as specified herein.
 - 2. Submit final reports to the County upon completion of the Work of this SECTION.

1.4 QUALITY ASSURANCE

- A. Qualifications, Inspection Service: County-approved firm showing satisfactory experience, and a minimum of five (5) years in inspecting projects with similar scope and types of waterproofing and roofing membranes and related flashings.

- B. Records: Maintain a complete and legible file, in chronological order, containing each report, certificate and other communication received relative to the Work of this SECTION.
- C. Pre-Installation Meetings:
 - 1. At least twenty-one (21) calendar days prior to start of each type of installation:
 - a. Establish a date and time for a pre-installation meeting acceptable to the inspection service inspector, Construction Inspector, County, and designated representatives.
 - b. Notify the membrane manufacturer, installers, other interested parties, and others whose Work may affect the quality of the roofing Work and secure their agreement to attend.
 - c. Furnish a list of persons expected to attend to the County.
 - 2. Schedule the first meeting at least seventy-two (72) hours prior to start of waterproofing, roofing, and related flashing Work.
 - 3. Unless otherwise notified in advance by the County, the inspection service inspector shall be chairperson of the meetings, will take minutes of the meeting, and will record agreements reached.
 - 4. Agenda:
 - a. Visually inspect all substrates upon which waterproofing and roofing are indicated to be applied.
 - b. Determine general acceptability and areas requiring further preparation.
 - c. Discuss and recommend acceptable remedies for unacceptable areas.
 - d. Review Contractor's Progress Schedule for installation of the waterproofing, roofing, and related flashing materials and reach agreement as to dates of start and finish of each installation.
 - e. Review proposed methods for material installation, and equipment and personnel to be used.
 - f. Review inspection methods to be used, reports to be issued by the inspection service inspector, and potential problems arising from use of methods not agreed to in the initial meeting(s).
 - 5. Refer to SECTION 013100 "COORDINATION" for further information.

1.5 RESPONSIBILITIES OF INSPECTION SERVICE

- A. Verify that materials delivered to the Site for installation of waterproofing and roofing are those specified in the Contract Documents.
- B. Record types and legible run numbers of all materials used each day.
- C. Inspect substrates and determine if they are acceptable for installation of materials.

- D. Inspect preparation and detailing of substrates.
- E. Observe installation of materials.
- F. Verify use of agreed upon methods.
- G. Call to attention of County and the Contractor to unacceptable methods or results.
- H. Report to County and the Contractor if the installers fail to correct unacceptable methods or unacceptable results.
- I. Make final inspection for each of the completed installations and list items that must be fixed or replaced.
- J. Furnish daily written reports to the County and a copy to the inspection service's main office for use in preparation of the final report.
- K. Upon completion of the installation, compile a comprehensive report covering activities performed under this SECTION and deliver a copy of report to:
 - 1. County.
 - 2. County designated representatives.
 - 3. Contractor.
 - 4. Architect.

1.6 LIMITS OF INSPECTION SERVICE RESPONSIBILITY

- A. The inspection service is not empowered to:
 - 1. Act for or in lieu of representatives of governmental agencies having jurisdiction.
 - 2. Give directions to the Contractor, installers, or workers on the job.
 - 3. Revise any part of the requirements for the Work.
- B. Failure of the inspection service inspector to observe unacceptable methods or unacceptable results during progress of the waterproofing, roofing, and related flashings installation will not relieve the Contractor from its responsibility to complete the Work in compliance with the specified requirements and the agreed methods.

1.7 HOT-RUBBERIZED WATERPROOFING

- A. In addition to the inspections performed by the inspection service, an authorized representative of the hot-rubberized coating manufacturer shall:
 - 1. Inspect all substrates prior to installation of any material.
 - 2. Verify membrane temperatures.
- B. During the course of the work, the Inspection Service shall check the wet film thickness of the applied material a minimum of twelve (12) times a day.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 015000

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes the requirements for furnishing, installing, and maintaining temporary facilities and controls as required to perform and protect the Work; relocating as required by the progress of the Work; and removal upon Project completion.
- B. Materials for temporary facilities and controls may be new or used, and suitable for the purposes intended.
- C. Materials, installation, and maintenance of temporary facilities and controls shall be in compliance with applicable regulatory requirements.
- D. Maintain temporary facilities in sound, neat and clean condition.
- E. Remove temporary facilities and controls, including associated materials and equipment, when their use is no longer required.
 - 1. Restore and recondition areas of the Site damaged and disturbed by temporary facilities and controls and their installation.
 - 2. Remove and properly dispose of debris resulting from removal and reconditioning operations.

1.2 TEMPORARY UTILITIES

- A. Electric Power and Lighting:
 - 1. Arrange with electric utility service company to provide service for power and lighting. Pay the costs for service and for power used.
 - 2. Distribute electric power and lighting.
 - 3. Provide lighting and convenience outlets in the temporary structures, and as otherwise required for the performance of the Work.
- B. Heat and Ventilation:
 - 1. Provide temporary heat to maintain environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation and curing of materials, and to protect materials and finishes from damage due to improper temperature and humidity conditions. Portable heaters shall be standard units complete with controls.
 - 2. Provide forced ventilation of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, and gases.

3. Pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.

C. Water:

1. Arrange with utility service company to provide water for construction purposes. Pay the costs for service and for water used.
2. Provide connections to water systems, air gap devices, backflow prevention devices, meters, storage tanks, truck fill risers, and other equipment as required by the utility company. Provide branch piping with taps located so that water for demolition and construction purposes is available throughout the Work by the use of hoses. All equipment used for applications of water shall be equipped with a positive means of shut off.
3. Protect piping, fittings, and other equipment from freezing.
4. Make potable water available for human consumption.

D. Sanitary Facilities:

1. Locate as approved by the County.
2. Maintain in a neat, sanitary condition, and adequately supplied.

E. Telephone and Facsimile Machine Service:

1. Provide and pay costs of telephone and facsimile machine (FAX) for Project use.
 - a. Provide one telephone and one facsimile machine in the Contractor's Project / Field Office and pay costs for installation, maintenance, service, and removal.
 - b. Provide other telephones, including coin-operated telephones for general use.

- F. Fire Protection: Provide and maintain fire extinguishers, fire hoses, and other equipment for fire protection. Such equipment shall be designated for use for fire protection only.

1.3 CONSTRUCTION AIDS

A. Plant and Equipment:

1. Furnish, operate, and maintain a complete plant for fabricating, handling, conveying, installing, and erecting materials and equipment; and conveyances for transporting workmen. Include elevators, hoists, debris chutes, and other equipment, tools, and appliances necessary for performance of the Work.
2. Maintain plant and equipment in safe and efficient operating condition. Damages due to defective plant and equipment, and uses made thereof, shall be repaired at no additional cost to the County.

1.4 BARRIERS AND ENCLOSURES

- A. General:
1. Provide and maintain temporary barriers and enclosures to prevent public entry to the Site and protect the Work from the elements, and adjacent construction and improvements, persons, and trees and plants from damage or injury from demolition and construction operations.
 2. Brace and secure against storm and accident.
- B. Fencing: Provide and maintain temporary fencing to secure laydown and office areas and to prevent public entry to the Site, as acceptable to the County. Equip fencing with secure gates as necessary. Locate vehicular gates in suitable relation to construction facilities and to avoid interference with traffic on public thoroughfares. Where emergency access may be required to reach hydrants, standpipes, or other fire protection equipment, provide labeled knock-out panels at points of most-direct access.
- C. Temporary Enclosures: Provide and maintain temporary enclosures to separate Work areas from areas occupied by County and to prevent the penetration of dust and noise into occupied spaces.
1. Construct with closed, sealed joints. Close or seal edges, penetrations, and intersections with other surfaces to prevent penetrations of dust and noise.
 2. Construct in accordance with fire-resistive requirements of regulatory agencies where indicated; maintain fire exits.
 3. Finish surfaces exposed to view of public as directed by the County.
- D. Tree and Plant Protection:
1. Preserve and protect existing trees and plants which are not designated or required to be removed, and those adjacent to the Site.
 2. Consult with the County prior to removal of roots and branches that interfere with demolition and construction operations.
 - a. Remove only those items agreed upon in writing with the County.
 - b. Employ a qualified tree surgeon to perform the removal, and to treat cuts.
 3. Provide barriers to a minimum height of 6'-0" around each tree and plant, around each group of trees and plants, as applicable, in the proximity of demolition and construction operations.
 4. In the proximity of root zones of trees and plants:
 - a. Prohibit vehicular traffic and parking.
 - b. Prohibit storage of materials and equipment.
 - c. Prevent dumping of refuse and chemically injurious materials and liquids.
 - d. Prevent puddling and continuous running water.

5. Carefully supervise excavating, grading, and filling, and subsequent construction operations, to prevent damage.
6. At no additional cost to the County, replace, or suitably restore trees and plants designated to remain that are damaged or destroyed as a result of demolition and/or construction operations.
7. Remove soil that has been contaminated during the performance of the Work by oil, solvent, paint, pesticide, improper disposal of concrete wash down water, and other materials that could be harmful to trees and plants, and replace with good soil, at no additional cost to the County. Dispose of contaminated soil in accordance with applicable regulatory requirements and the local health department.

1.5 SECURITY

A. General:

1. Secure, maintain, and protect the Work, stored materials, equipment, tools, and temporary facilities until time of Acceptance, or such earlier time as County may choose to assume such responsibility.
2. Security and protection may be by any legal method, or combination of methods, acceptable by the County.
3. The County shall not be held to have incurred any liability for loss of, and damage to, materials, tools, and equipment of the Contractor or of those employed by him, by Contract, or otherwise.

B. Lighting: Furnish lighting, as acceptable to the County, as necessary to protect and safeguard the Work.

C. Watchman Services:

1. Furnish watchman services, as acceptable to the County, as necessary to protect and safeguard the Work. The County shall not in any way be liable for the damage or loss to the Work due to trespass or theft.
2. The County may provide such watchman service as it deems necessary to protect its interest during the progress of the Work. Any protection provided by the County shall not in any way relieve the Contractor of the responsibility for the safety of the Work and acceptance thereof.

1.6 TEMPORARY CONTROLS

A. Noise and Vibration Controls:

1. Equipment and impact tools shall have intake and exhaust mufflers.
2. Secure written permission from the County at least three (3) working days prior to using noisy and vibratory equipment, such as jackhammers, concrete saws, impact tools, and high-frequency electrical equipment.

3. Cooperate with the County if the use of noisy and vibratory equipment becomes objectionable by its longevity.

B. Dust and Dirt Control:

1. Conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in Work and adjacent areas.
2. Periodically water exterior demolition and construction areas to minimize the generation of dust and dirt. Water used for dust control shall be applied by means of pressure distributors or pipelines equipped with spray systems or nozzles that will insure uniform application of water.
 - a. Water shall be fresh and clean and free from oil, acid, organic matter, and other harmful substances.
 - b. If the Contractor wishes to use reclaimed water for compaction and dust control purposes, a CCR Title 22 water quality analysis shall be submitted to the County for approval. The County reserves the right to prohibit the use of reclaimed water.
 - c. If the Contractor elects to use chemical additives in water for compaction or dust control, it shall be at his sole expense. The County reserves the right to prohibit the use of a particular additives.
3. To additionally minimize the generation of dust and dirt, hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins.
4. Prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drainage systems.
5. Provide and maintain dams, settling ponds, and filtering structures as required to keep construction debris and soil erosion from entering sewer and storm drainage systems.
6. If, in the opinion of the County, the Contractor's operations are creating unreasonable dust, the Contractor shall apply supplemental water for dust control in areas so designated.

C. Water Control:

1. Do not permit surface and subsurface water and other liquids to accumulate in or about the Site and vicinity thereof.
2. Should such conditions develop, control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods acceptable to the County.

D. Pollution Control:

1. Comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of construction and disposal operations. Do not cause

pollution, contamination, or other damage to natural or built environment, including but not limited to soil, ground water, and air.

2. Provide wash down facilities for the cleanup of trucks, equipment, and other vehicles and the ultimate removal and disposal of wastes generated from the cleaning. Construct the facilities in such a manner to not cause pollution of underground water resources.

E. Waste and Debris Control:

1. Provide adequate canisters with lids as required for the containment of waste such as trash, rubbish, debris, excess materials, and other items until they can be removed from the Site. Do not allow refuse to accumulate at Project Site without proper containment.
2. Remove waste from construction areas and the Site on a regular basis. Do not allow to accumulate. Dispose of waste in a legal manner off-Site. No burying, burning, or abandonment of refuse, debris, or other materials shall be permitted on or in the vicinity of the Site.
3. Do not allow flammable materials to be stored at the Site without approved fire protection precautions and procedures. Comply with NFPA 241 for removal of combustible waste and debris.

F. Pest Control: Take adequate provisions to control rodents, insects, and other pests.

1.7 PERIODIC CLEANING

- A. Maintain Site, work areas, and storage areas in a clean, safe, and orderly condition and free of waste materials and debris.
- B. Comply with applicable regulatory requirements for cleaning and for the removal, storage, and disposal of waste materials and debris.
- C. Schedule cleaning operations to prevent dust and other contaminants resulting from cleaning from adhering to wet or newly finished surfaces.
- D. Use cleaning materials and methods recommended by the manufacturers of the materials and products to be cleaned. If specific cleaning materials are not recommended, use cleaning materials that will not create hazards to health or property or cause damage to materials, products, or Work.
- E. Clean areas where Work is in progress to the level of cleanliness necessary for the proper execution of the Work.
- F. Remove debris and rubbish from closed or remote spaces, prior to enclosing the space.
- G. Maintain installed Work in a clean condition.
- H. Public Roadway Maintenance:
 1. Promptly remove spills resulting from hauling operations along or across public streets, roads, and other thoroughfares.

2. Maintain gutters and roadside ditches clean and free from trash, erosion, dust nuisance, and obstructions.
- I. If, in the opinion of the County, additional cleaning or roadway maintenance is required the Contractor shall provide such at no additional cost to the County.
- J. Final cleaning is specified in SECTION 017423 "FINAL CLEAN UP".

1.8 PROTECTION OF INSTALLED WORK

- A. Protect installed Work as required for the duration of the construction period to ensure Work will be without damage and deterioration at time of completion and Acceptance by the County.
- B. Comply with manufacturers' printed instructions for Site conditions and protection of materials and products, including temperature and humidity.

1.9 CORRECTIONS TO WORK

- A. Restoration of Deteriorated and/or Damaged Work:
 1. Restore, or remove and replace, as specified or determined by the Architect, material and finishes that are deteriorated and/or damaged from construction activities at no additional cost to the County.
 2. Restoration shall be equal to the original Work and finishes shall match the appearance of existing adjacent Work and show no visual evidence of restoration.
- B. Remedial Work:
 1. Remedial Work necessary owing to faulty workmanship or materials shall be at no additional cost to the County.
 2. Work shall be coordinated with the County and performed at such time and in such manner to cause minimal interruption and inconvenience to the County's operations, as acceptable to the County.

1.9 PROJECT / FIELD OFFICE

- A. Designated portions of the temporary parking lot will be available to the Contractor for use in locating their Project / Field Office in accordance with the CONTRACT REQUIREMENTS.
- B. Provide furniture and equipment in accordance with the CONTRACT REQUIREMENTS.
- C. Maintain in a neat, clean, and sanitary condition as acceptable to the County.

END OF SECTION

SECTION 015100

TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Provision of temporary utilities for the Contractor's use.
 - 2. Utility interruptions.
 - 3. Related Submittals.
- B. Related Sections:
 - 1. Section 01 50 00 - Temporary Facilities and Controls

1.2 DESCRIPTION

- A. PG&E (Pacific, Gas & Electric), AT&T (American Telephone & Telegraph)
- B. Contractor shall provide its own office and construction utilities including the cost of permits, usage, generation, installation, relocation, distribution, maintenance, safety, disposal, and removal. Coordinate this work with other contractors.
- C. Contractor shall coordinate installation and removal of temporary utilities with PG&E, AT&T other contractors, and the County Representative. Plans, shop drawings, and product data shall be submitted to the County Representative for approval of proposed temporary utilities and facilities.
- D. Contractor shall not install or remove any temporary utility without prior written approval of the County Representative. The County Representative's written approval does not guarantee or warrant that utilities installed by the Contractor will not require relocation in the future due to the follow-on and/or sequence of work by Contractor or others or by changes in scope and sequence of work by the State.
- E. Temporary utilities placed underground shall be permanently marked as to prevent damage by others, and accurately located for removal. Damage to above ground and underground utilities by the Contractor shall be repaired or replaced by the Contractor at no cost to the State
- F. Obtain permits and inspections required by public utility companies County and/or special districts for the installation and use of temporary utilities. Utility installations shall comply with all codes and regulations.
- G. The Contractor is cautioned that there is limited space available on site for temporary storage yards, trades parking, storage buildings, and temporary office space. Limited staging area will be made available to the contractor, however, the Contractor shall satisfy itself that the staging area is adequate for the Contractor's use. If the staging area is not adequate, the Contractor shall find additional staging area for itself offsite. No additional payment will be made to the Contractor for additional staging area.

- H. Parking: The Contractor shall be cautioned that there is limited parking space for the Contractor's personnel. If additional parking is required by the Contractor's employees, Contractor shall make arrangements in accordance with local ordinances at his own cost.
- I. Contractor shall submit for approval the contractor's proposed plan for temporary utilities, storage facilities/yards, temporary offices/trailers, and temporary construction water.

1.3 ELECTRICITY

- A. Provide power required for construction operations. Reimburse County for the cost of any permanent power used, including power used for testing and commissioning of equipment and systems.
- B. Permanent convenience receptacles may not be used during construction.
- C. Contractor shall install electrical service to service hubs each with main breaker, metering cabinet, cable, wooden backboard and post supports as shown on the drawings.
- D. Coordinate the meter and space on the service termination enclosures, and pay all costs to provide electrical service to Contractor's site office. Cost of electricity for Contractor's site office shall be paid for by Contractor.
- E. Temporary electrical power installation shall comply with applicable local codes and requirements of the California Electric Code.

1.4 ILLUMINATION

- A. The Contractor shall provide temporary lighting in all work areas sufficient to maintain a lighting level during working hours not less than the lighting level required by OSHA standards.
- B. Permanent building lighting may not be used during construction.

1.5 HEAT

- A. Provide heat required for construction operations.
- B. Permanent heating facilities may not be used.

1.6 VENTILATION

- A. Ventilate enclosed areas to assist cure of materials, dissipate humidity, and prevent the accumulation of dust, fumes, vapors, and gases.
- B. Permanent ventilation systems may not be used.

1.7 TELEPHONE SERVICE

- A. Coordinate with AT&T; pay all costs associated with providing telephone service to Contractor's site office from the termination enclosures. Cost of telephone service for Contractor's site office shall be paid for by the Contractor.
- B. Provide directory of site and emergency contact numbers of Contractor and all subcontractors.

1.8 WATER

- A. The temporary water system shall be used only for the Contractor's trailers/office and shall not be used for construction or dust control purposes. The Contractors shall be responsible for providing water to support their construction operations.
- B. Permanent water system may not be used during construction.

1.9 SANITARY SERVICE

- A. Permanent facilities may not be used.
- B. Provide and pay for temporary sanitary facilities for Contractor's office and construction personnel. Field toilets or belly tanks integrally connected to the underside of the contractor's trailer/office shall be used. Field toilets shall be of the chemical type.
- C. Placement and maintenance of belly tanks or toilets shall not interfere with the work of others. Relocate toilet facilities that are interfering with the work of others, or as directed by County Representative at no cost to the State.

1.10 OTHER UTILITIES AND WASTE DISPOSAL SERVICES

- A. Provide other temporary utilities required to complete the work.
- B. The Contractor shall dispose of surplus materials, waste products, and debris and shall make necessary arrangements for such disposal. The Contractor shall obtain written permission from property County prior to disposing surplus materials, waste products, or debris on private property.
 - 1. Ditches, washes, or drainage ways shall not be filled.
 - 2. Disposal operations shall not create unsightly or unsanitary nuisances.The Contractor shall maintain the disposal site in a condition of good appearance and safety during the construction period. If in the opinion of the County Representative the site appearance is not in good appearance the County Representative will require the Contractor to perform site cleanup.

1.11 REMOVAL OF TEMPORARY UTILITIES AND FACILITIES

- A. Remove temporary utilities installed for the Contractor's sole use prior to final inspection. The Contractor shall notify the County Representative of the Contractor's intent and schedule for removal of the temporary facilities and utilities and obtain the County Representative approval before removing the same.
- B. Remove temporary utilities utilized to complete interim Milestones prior to final inspection of interim Milestones, upon written approval by the County Representative, and at the sole discretion of the County Representative.
- C. Repair damage or alteration of in place work, grades, and finishes caused by installation, removal, and use of temporary utilities. The condition of the areas shall be left in a condition that will restore original drainage, be evenly graded, and be left with an appearance equal to or better than original condition.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

SECTION 017419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Definitions.
2. Performance Requirements.
3. Submittals.
4. Quality Assurance.
5. Construction Waste Management Plan.
6. Plan Implementation.
7. Salvaging and Recycling Demolition Waste.
8. Disposal of Waste.

B. Related Sections

1. Sections within 02 41 00 "Demolition": Disposition of waste resulting from demolition of buildings, structures, and site improvements.

1.2 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, paint, or the like.
- B. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- C. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- E. Diversion: Avoidance of demolition and construction waste sent to landfill or incineration. Diversion does not include using materials for landfill, alternate daily cover on landfills, or materials used as fuel in waste-to-energy processes.
- F. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitability, corrosiveness, toxicity or reactivity.

- G. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- H. Recycling: The process of sorting, cleansing, treating, and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Salvage: Recovery of demolition or construction waste and subsequent reuse or sale in another facility.
- J. Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- K. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- L. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- M. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- N. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- O. Waste Management Coordinator hired by Contractor to implement, monitor and report status of waste management work plan.

1.3 PERFORMANCE REQUIREMENTS

- A. The Owner Representative has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Of the waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills or incinerators shall be minimized, thereby reducing disposal costs.
- C. Develop a construction waste management plan that results in end-of-Project rates for salvage/recycling of 95-percent (by weight) of construction and demolition waste.
- D. Salvage/Recycle Requirements: Salvage and recycle as much non-hazardous demolition and construction waste as possible, including the following materials:
 - 1. Demolition Waste:
 - a. Asphaltic concrete paving
 - b. Concrete

- c. Concrete reinforcing steel
 - d. Brick
 - e. Concrete masonry units
 - f. Wood studs
 - g. Wood joists
 - h. Plywood and oriented strand board
 - i. Wood paneling
 - j. Wood trim
 - k. Structural and miscellaneous steel
 - l. Rough hardware
 - m. Roofing
 - n. Insulation
 - o. Doors and frames
 - p. Door hardware
 - q. Windows
 - r. Glazing
 - s. Metal Studs
 - t. Gypsum board
 - u. Acoustical tile and panels
 - v. Carpet
 - w. Carpet pad
 - x. Demountable partitions
 - y. Equipment
 - z. Cabinets
 - aa. Plumbing fixtures
 - bb. Piping
 - cc. Supports and hangers
 - dd. Valves
 - ee. Sprinklers
 - ff. Mechanical equipment
 - gg. Refrigerants
 - hh. Electrical conduit
 - ii. Copper wiring
 - jj. Lighting fixtures
 - kk. Lamps
 - ll. Ballasts
 - mm. Electrical Devices
 - nn. Switchgear and panelboards
 - oo. Transformers
2. Construction Waste:
- a. Masonry and CMU
 - b. All untreated wood, including lumber and finish materials
 - c. Wood sheet materials
 - d. Wood trim
 - e. Metals
 - f. Roofing
 - g. Insulation
 - h. Carpet and pad
 - i. Gypsum board
 - j. Unused (leftover) paint

- k. Piping
- l. Electrical conduit
- m. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100-percent of the following uncontaminated packaging materials:
 - 1) Paper
 - 2) Cardboard
 - 3) Boxes
 - 4) Plastic sheet and film
 - 5) Polystyrene packaging
 - 6) Wood Crates
 - 7) Plastic pails
- n. Beverage and packaged food containers

1.4 SUBMITTALS

- A. Construction Waste Management Plan (CWMP): It is the intent of this specification to maximize the diversion of demolition and construction waste from landfill disposal. Accordingly, not more than 30 days after receipt of Notice to Proceed and prior to the generation of any waste, prepare and submit a draft Construction Waste Management Plan in accordance with this Section including, but not limited to, the following:
 - 1. Procedures for Recycling/Reuse Program to divert a minimum of 90-percent (by weight) of construction and demolition waste from landfill disposal, including waste resulting from demolition of any existing building and site paving scheduled for demolition; any site paving is required to be ground on site and reused as granulated fill on-site.
 - 2. Approval of the Contractor's CWMP shall not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.
- B. Submit a 3-ring binder with calculations on end-of-project recycling rates, salvage rates, and landfill rates itemized by waste material, demonstrating that a minimum of 75-percent of construction wastes were recycled or salvaged and diverted from landfill. Include documentation of recovery rate (if commingled), waste hauling certificates or receipts, and a brief narrative explaining how and to where each waste type has been diverted.
- C. Construction Waste Management Plan: Submit four copies of plan within 60 days of date established for the Notice to Proceed.
- D. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit four copies of report. Include separate reports for demolition and construction waste. Include the following information:
 - 1. Material category
 - 2. Generation point of waste
 - 3. Total quantity of waste in tons
 - 4. Quantity of waste salvaged, both estimated and actual in tons
 - 5. Quantity of waste recycled, both estimated and actual in tons
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons

- 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste
- 8. Include up-to-date records of donations, sales, recycling and landfill/incinerator manifests, weight tickets, hauling receipts, and invoices.

E. Waste Reduction Calculations: Before request for Substantial Completion, submit four copies of calculated end-of-project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work. Complete a table similar to the example below.

Recycled/Salvaged/Diverted Materials	Hauler or Location	Quantity of Material (tons)
Total Construction Waste Diverted		
Landfilled Materials		
Total Construction Waste Landfilled		

Total Construction Waste		Total Construction Waste Diverted + Total Construction Waste Landfilled
Percentage of Construction Waste Diverted from Landfill		(Total Construction Waste Diverted / Total Construction Waste)*100

- F. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax-exempt.
- G. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax-exempt.
- H. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- I. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills (or transfer stations) and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with all applicable local ordinances and regulations.
- B. Waste Management Meetings: Conduct an initial conference at Project Site to comply with requirements of Division 1. Contractor shall include discussions on construction waste management requirements in the preconstruction meeting. Contractor shall include discussions on construction waste management requirements in the regular job meetings conducted during the course of the Project; at these meetings, review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of the Waste Management Coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.6 CONSTRUCTION WASTE MANAGEMENT PLAN

- A. General: Develop and implement a CWMP consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use the same units of measure throughout the CWMP.
- B. Draft Construction Waste Management Plan: Within 30 days after receipt of Notice to Proceed, or prior to any waste removal, whichever occurs sooner, the Contractor shall submit to the Owner and Architect a Draft Waste Management Plan.
- C. Final Construction Waste Management Plan: Once the Owner has determined which of the recycling options addressed in the draft Waste Management Plan are acceptable, the Contractor shall submit, within 15-calendar days, a Final Waste Management Plan.
- D. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- E. Landfill Options: Indicate the name of the landfill(s) and/or transfer station(s) and/or incinerator(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Project waste in the landfill(s).

- F. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, reused, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Describe method that will be used for separating recyclable waste, including sizes of containers, container labeling, and designated location on Project Site where materials separation will be located.
- G. Materials: The following list of required materials, at a minimum, must be included for salvaging/recycling:
1. Cardboard
 2. Clean dimensional wood
 3. Beverage and food containers
 4. Paper
 5. Concrete
 6. Concrete Masonry Units (CMUs)
 7. Asphalt: Include the approximate weight of the asphalt paving to be crushed and utilized as granulated fill from the existing paving as a component of waste material diverted from the landfill.
 8. Ferrous and non-ferrous metals (banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze)
 9. Stretch and shrink wrap
 10. Gypsum wallboard
 11. Paint containers and other clean, empty plastic containers
- H. Meetings: Provide a description of the regular meetings to be held to address waste management.
- I. Materials Handling Procedures: Provide a description of the means by which any waste materials identified will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities
- J. Transportation: Provide a description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

1.7 CONSTRUCTION WASTE MANAGEMENT PROCEDURES

- A. General information contacts regarding construction and demolition waste:
 - 1. EPA Construction and demolition (C&D) debris website:
<http://www.epa.gov/epaoswer/non-hw/debris-new/bytype>.
 - 2. Directory of Wood-Framed Building Deconstruction and Reused Building Materials Companies:
http://www.fpl.fs.fed.us/documnts/fplgtr/fpl_gtr150.pdf

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General Implement waste management plan as approved by Owner Representative. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at the Project Site full-time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project Site.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Refer to Section 01 35 53 for Security Procedures.
 - 1. Designate and label specific areas on Project Site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold. Location as designated by Owner Representative.
 - 2. Recycling and waste bin areas are to be kept neat, and clean, and clearly marked in order to avoid contamination of materials.
 - 3. Comply with Section 01 50 00 for controlling dust and dirt, environmental protection, and noise control.
- E. Hazardous Wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations and should not be included in Construction Waste Management Plan's calculations of waste.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Owner's Use:

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. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:

1. List to be developed by Contractor.

C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project Site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project Site. Include list of acceptable and unacceptable materials at each container and bin.
2. Inspect containers and bins for contamination and remove contaminated materials if found.
3. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
4. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
5. Store components off the ground and protect from the weather.
6. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility or recycle on-site into new paving.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 4-inch (100-mm) size.
 - 2. Crush concrete and screen to comply with requirements of Section 31 20 00 – “Earthmoving” for use as satisfactory soil for fill.
- C. Masonry: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize masonry to maximum 1-1/2-inch (38-mm) size.
Crush masonry and screen to comply with requirements of Section 31 20 00 – “Earthmoving” for use as general fill or subbase.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, and panel products for reuse and/or recycling. Separate wood material treated with heavy metal preservatives for reuse or landfill disposal.
- E. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts for recycling into asphalt paving or by other recycling entities.
- G. Gypsum Board: Stack large, clean pieces on wood pallets and store in a dry location for recycling off-site. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- H. Acoustical Ceiling Panels and Tile: Stack large, clean pieces on wood pallets and store in a dry location.
 - 1. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.
- I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet and pad in a closed container or trailer provided by a carpet recycler or manufacturer-related carpet reclamation agency.
- J. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- K. Plumbing Fixtures: Separate by type and size.

- L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- M. Lighting Fixtures: Separate lamps by type and protect from breakage.
- N. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- O. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project Site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

1. Comply with requirements in Division 2 Section "Exterior Plants" for use of chipped organic waste as organic mulch.

C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into material appropriate for mulch or erosion control.
2. Lumber Treated with Heavy-Metal Preservatives: Do not grind, chip, or incinerate; must be reused or landfilled.

D. Gypsum Board: Stack large, clean pieces on wood pallets and store in a dry location for recycling and/or reuse on-site or off-site.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

E. Miscellaneous: Anything called out to be ground and used on-site should utilize an on-site grinder.

1. Grinder should be able to accommodate a variety of materials including masonry, asphalt shingles, wood, and drywall.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Do not burn or bury waste materials on or off site. Appropriate on-site topical application of ground gypsum or wood, or use of site paving as granulated fill is considered reuse, not waste

END OF SECTION

SECTION 017423

FINAL CLEAN-UP

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes the requirements for final cleanup of the Work.
- B. This Work consists of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power as necessary or required for the final cleanup of the Work.
- C. Periodic cleaning is specified in SECTION 01 50 00 "CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS".

1.2 GENERAL REQUIREMENTS

- A. Comply with applicable regulatory requirements during the conduct of cleaning and disposal operations.
- B. Use cleaning materials that will not create hazards to health or property or cause damage to products or Work.
- C. Use cleaning materials and methods recommended by the manufacturers of the products to be cleaned.
- D. Schedule operations to prevent dust and other contaminants resulting from cleaning operations from adhering to wet or newly finished surfaces.

1.3 FINAL CLEANUP

- A. General:
 - 1. As a condition of Final Acceptance of the Work, the Contractor shall carefully clean up the Work and the premises, remove all temporary structure built by or for him, remove all surplus construction materials, debris, and rubbish of all kinds from the grounds which he has occupied and leave them in a neat condition.
 - 2. The entire Project shall be left in a condition that will present a pleasing appearance as viewed in general and in a manner satisfactory to the County.
- B. Perform the following cleaning operations as applicable to the Work of this Contract:
 - 1. Remove and dispose of sticks, rubbish, debris, and surplus materials from Site and roof areas.
 - 2. Broom-clean exterior paved surfaces; flushing will not be permitted.

3. Rake clean lawn and landscaped areas.
 4. Clean and remove all soil, debris, and the like from drainage structures and systems.
 5. Remove dust, dirt, grease, stains, fingerprints, labels, spilled and spattered, and other foreign materials from interior and exterior surfaces exposed to view.
 6. Vacuum-clean interior spaces including cabinetwork. Wet mop hard floors.
 7. Wash and shine mirrors and both sides of glazing.
 8. Wash and polish glossy surfaces to a clear shine.
 9. Mechanical heating, ventilation, and air conditioning systems:
 - a. Clean diffusers, grilles, and registers.
 - b. Clean permanent filters and replace disposable filters of units operated during construction.
 - c. Clean ducts, blowers, and coils if units were operated without filters during construction.
 10. Plumbing Fixtures: Clean, sanitize, and polish plumbing fixtures, drains, and fittings.
 11. Electrical Fixtures and Equipment:
 - a. Vacuum and wipe insides of electrical panels.
 - b. Clean electrical equipment.
 - c. Wash and polish lighting fixtures including the inside and outside of fixture lenses and diffusers.
- C. The County will perform a final inspection of the cleanup of the Site and the Contractor shall remedy such problems noted during the inspection or provide such additional Work as the County deem appropriate at no additional cost to the County.

1.4 WASTE AND EXCESS MATERIALS

- A. Remove waste and excess material from the Site and dispose of in a legal manner.

END OF SECTION

SECTION 017700

CLOSE OUT

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes the requirements and the administrative procedures for closing out the Work, which includes but is not limited to , Final Completion, and Acceptance.

1.2 PREPARATION FOR

- A. When the Work, or designated phase thereof, is substantially complete, submit the following to the County:
 - 1. A written notice that the Work is substantially complete.
 - 2. A detailed, complete, and comprehensive list of items to be completed or corrected.
 - 3. Certification that all mechanical, electrical, plumbing, security, communications, audio-visual and hardware equipment has been tested and is operational. The Contractor shall provide copies of all test results and reports including a binder by division fully indexed, outlining all equipment and performance tests. In addition, the Contractor shall certify the County's maintenance and operational personnel have received the specified training.
- B. After receipt of the above items, the County will set up an inspection to determine whether or not the Project, or designated phase thereof, is ready for punch list inspection.
- C. Should the County determine that the Work is so incomplete that it does not warrant a punch list inspection, the County will:
 - 1. Within a reasonable amount of time notify the Contractor in writing that the Work is incomplete. Charges may be assessed for re-inspection.
 - 2. Instruct the Contractor to promptly remedy the deficiencies in the Work, and send a second notice of to the County after remedying the deficiencies.

1.3 ACHIEVING

- A. When the Contractor determines that the Work is ready for the punch list inspection, the Contractor shall arrange for the inspection by the County.
- B. The County will prepare a coordinated punch list and will determine which items shall be completed by the Contractor to achieve .
- C. The County will transmit the hand written punch lists to the Contractor. The Contractor shall, within five working days upon receipt, computerize the punch lists with the format approved by the County and provide three copies. The Contractor shall add items to the computerized punch list as they are provided by the County. The Contractor shall update the punch list status weekly as provided by the County.

The Contractor shall provide a punch list status each week indicating progress until all items are complete. When all items are complete, the Contractor shall request a second punch list inspection. The County will inspect to verify completion by the Contractor and will advise items to complete to reach .

- D. Beneficial Occupancy and are not one and the same. The County has the right to beneficially occupy any portion of the Project, or the Project as a whole, at any time in accordance with the General Conditions.

1.4 PRE-WARRANTY ISSUES

- A. During the transition period between and Final Completion, the County's maintenance and operations personnel may find omissions and defects and will issue the omissions and defects report using the warranty procedure. The Contractor shall provide a weekly, computerized status log of these issues and shall update. This process will provide training in the warranty procedures for the County and Contractor.
- B. It should be noted that the pre-warranty issues do not create Acceptance and do not initiate the formal warranty period as prescribed by the Contract. The pre-warranty issues must be considered as another form of a punch list that must be completed prior to Final Completion and/or Acceptance or a credit charge will be taken for their value.

1.5 FINAL COMPLETION

- A. When the Contractor considers the Work to be complete for final inspection, he shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with the Contract Documents.
 - 3. Work has been completed in accordance with the Contract Documents.
 - 4. Work is completed and ready for final inspection.
 - 5. Submit certified copy of final punch list of itemized Work to be completed or otherwise resolved for Acceptance, endorsed and dated by the County.
 - 6. Obtain the required Certificate of Occupancy.
- B. After receipt of the above, the County will set up an inspection to determine whether or not the Project is ready for final inspection. The review will consist of verifying that the remaining punch list items from the inspection have been completed.
- C. Should the County find the Work to be incomplete, the County will advise the Contractor in writing that the Work is not acceptable. The Contractor may be assessed for additional inspection costs.
- D. The Contractor shall send another Certificate when the Work is complete.
- E. After the County has completed the final inspection and when the County finds that the Work is complete under the Contract Documents, the County will determine the Date of Final Completion and will notify the Contractor. The Contractor shall proceed to prepare for final close out/acceptance and shall make final close out submittals.

1.6 CLOSE OUT/ACCEPTANCE

- A. Prior to Acceptance by the County, the Contractor shall:
1. Submit a statement showing accounting of changes to the Contract Sum.
 2. Submit warranties, maintenance agreements, final certifications, and similar documents required by the Contract Documents.
 3. Advise the County of pending insurance change-over requirements.
 4. Obtain and submit releases enabling the County's full and unrestricted use of the Work and access to services and utilities, including where required occupancy permits, operating certificates, and similar releases. Provide all release of liens and claims from Subcontractors and Suppliers. List all outstanding claim issues that will be litigated (see below).
 5. Submit final record documents, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information as required by the Contract Documents.
 6. Deliver tools, spare parts, extra stocks of materials, and similar physical items to the County.
 7. Make final change-over of locks and forward keys to the County. Advise the County's personnel of change-over in security provisions.
 8. Remove all temporary facilities and services, along with construction tools and equipment, mock-ups, and similar elements.
 9. Prepare final Application for Payment in accordance with the General Conditions and these Specifications.
 10. The Contractor shall provide a Final Completion report in a 3-ring binder which shall consist of the following:
 - a. A summary time analysis providing a justification for any time extensions being requested which have not been approved. Printout and graphic for original base line and final as-built.
 - b. A summary of all potential claims from the Contractor against the County. Attach copies all claims made to date and new claims which are being submitted.
 - c. A copy of all record documents and/or transmittals of record documents previously submitted.
 - d. A copy of operation and maintenance manuals and/or transmittals of operation and maintenance manuals previously provided.
 - e. A copy of all training information and information establishing dates training was provided to the County.

- f. All materials, parts, and keys and/or a copy of transmittals of items previously provided to the County.
 - g. A summary of all change requests which the Contractor believes are outstanding and are not included in the aforementioned claims.
 - h. A copy of the punch list with all items initialed off by the County.
 - i. An unconditional release of all liens, stop notices, and claims from the Subcontractors and Suppliers.
 - j. Contractor's request for final payment.
 - k. Additional copies of all warranties and guarantees.
 - l. Documents confirming all final testing and start-up operations which were conducted.
- B. After Acceptance of the Work by the County and Notice of Completion has been filed by the County, and the proper time has elapsed, the final payment will be made (less any outstanding items).

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

SECTION 017823

OPERATION & MAINTENANCE DATA AND TRAINING

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes the requirements for furnishing product data and related information appropriate for County maintenance and operation of all products, equipment, and systems furnished under the Contract.
- B. Instruct County personnel in the maintenance of products and in the operation of equipment and systems.

1.2 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel trained and experienced in maintenance and operation of the described products, completely familiar with specified requirements, skilled as a technical writer to the extent required to communicate essential data, and skilled as a draftsman competent to prepare required drawings.

1.3 FORM OF OPERATING AND MAINTENANCE (O & M) SUBMITTAL

- A. Prepare a detailed training plan agenda for each instructional session for all mechanical, electrical, plumbing, hardware, communications, products, equipment, and systems to be approved by the County. Each training session shall be divided into two parts: (1) Classroom training and, (2) On-the-job operational instructions of the equipment. Prepare data in the form of an instruction manual for use by County personnel and the Contractor's instructors for classroom and job site training. The instructional/user's manual shall be prepared to organize and synthesize documents along with operating instructions and functional information. The manual will be used as the single source of information about the equipment and systems, operations, and functions.
- B. Format:
 - 1. Size: 8-1/2 inches x 11 inches.
 - 2. Paper: 20 pound minimum, white, for typed pages.
 - 3. Text: Manufacturers' printed data, or neatly typewritten.
 - 4. Drawings: Furnish reinforced punched binder tab, bind in with text. Fold larger drawings to the size of the text pages.
 - 5. Provide fly-leaf for each separate product, or each piece of operating equipment. Provide typewritten description of product, and major component parts of equipment. Provide indexed tabs.
 - 6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List title of Project and identity of general subject matter covered in the manual.

- C. Binders: Utilize commercial quality three-ring binders with durable and cleanable plastic covers.

1.4 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in a systematic order by specification number.
- B. For each Specification SECTION provide:
 - 1. Contractor, name of responsible principal, address, and telephone number.
 - 2. A list of each product and certification warranty/guarantee required to be included, indexed to the content of the volume.
 - 3. List, with each product, the name, address, and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify the source of responsibility of each.
 - d. Local source of supply for parts and replacements.
 - 4. Identify each product by product name and other identifying symbols as set forth in the Construction Documents.
 - 5. Product data, drawings, written text, etc. Include description of equipment, operating procedures, maintenance procedures, service schedule, etc. For materials and finishes give product information, instructions for care, etc.
- C. Product Data:
 - 1. Include only those sheets which are pertinent to the specific product.
 - 2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Delete references to inapplicable information.
 - d. Content shall include names listed in Articles 1.05 and 1.06 below.
- D. Drawings:
 - 1. Supplement Product Data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 - 2. Coordinate drawings with information on Project record documents to assure correct illustration of completed installation.

3. Do not use Project record documents as maintenance drawings.
- E. Written text is required to supplement product data for the particular installation for all mechanical, electrical, plumbing, heating, air conditioning, security, hardware, and communication systems.
 1. Organize in a consistent format under separate headings for different procedures.
 2. Provide a logical sequence of instructions for each procedure.
- F. Copy of each warranty, bond, and service contract issued.
 1. Provide information sheet for County personnel; include:
 - a. Proper procedures in the event of failure.
 - b. Instances which might affect the validity of warranties or bonds.
- G. Provide copies of performance tests.

1.5 O & M MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit three (3) copies of complete manual in final form.
- B. Content for each unit of equipment and system, as appropriate:
 1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.
 2. Operating procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down, and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 3. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair, and reassembly.
 - d. Alignment, adjusting, and checking.
 - e. Schedule for recommended service and preventative maintenance.

4. Servicing and lubricating schedule.
 - a. List of lubricants required.
 5. Manufacturer's printed operating and maintenance instructions.
 6. Description of sequence of operation by control manufacturer.
 7. Original manufacturer's part list, illustrations, assembly drawings, and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 8. As-installed control diagrams by controls manufacturer.
 9. Each Subcontractor's coordination drawings.
 - a. As-installed color coded piping diagrams.
 10. Charts of valve tag numbers, with the location and function of each valve.
 11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
- C. Content, for each electrical and electronic system, as appropriate:
1. Description of system and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 2. Circuit directories of panel boards.
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 3. As-installed color coded wiring diagrams.

4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 5. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair, and reassembly.
 - d. Adjustment and checking.
 - e. Schedule for preventative maintenance.
 6. Manufacturer's printed operating and maintenance instructions.
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required under pertinent Specification SECTIONS.
- D. Prepare and include additional data when the need for such data becomes apparent during instruction of County personnel.
- E. Additional requirements for operating and maintenance data is specified in the respective Specifications SECTIONS.
- F. Provide complete information for operating products and equipment specified in each Specification SECTION.

1.6 O & M MANUAL FOR MATERIALS AND FINISHES

- A. Submit three (3) copies of complete manual in final form.
- B. Content, for architectural products, applied materials and finishes:
 1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, composition.
 - b. Color and texture designations.
 - c. Information required for re-ordering specially manufactured products.
 2. Instructions for care and maintenance.
 - a. Manufacturer's recommendation for types of cleaning agents and methods.

- b. Cautions against cleaning agents and methods which are detrimental to the product.
 - c. Recommended schedule for cleaning and maintenance.
 - C. Content, for moisture-protection and weather-exposed products:
 - 1. Manufacturer's data, giving full information on products.
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 - 2. Instructions for inspection, maintenance, and repair.
 - D. Additional requirements for maintenance data is specified in respective Specification SECTIONS.
 - E. Provide complete information for finished products or surfaces specified in each Specification SECTION.

1.7 SUBMISSION SCHEDULE

- A. Submit three (3) copies of completed data in final form thirty (30) days prior to the estimate date of Substantial Completion for the County's review. Data will be used by the inspectors and for training of County personnel. Make all corrections noted by the County and agents prior to their use for training and return for review. Upon Acceptance furnish training prior to Substantial Completion. Two (2) copies will be returned after the Substantial Completion.
- B. Submit three (3) copies of accepted data in final form ten (10) days after final inspection.

1.8 INSTRUCTION OF COUNTY PERSONNEL

- A. Prior to County's inspection for Substantial Completion, fully instruct County designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems, mechanical, electrical, plumbing, heating, or air conditioning, security, communications, and hardware systems based on the reviewed maintenance manuals.
- B. The user's operating and maintenance manual, training plan, and agenda shall constitute the basis of instruction with the Contractor for each piece of equipment and/or system. The Contractor shall provide training schedules fourteen (14) days in advance of all training for approval by the County.

1. The Contractor shall arrange for on-site training and review of each piece of equipment and system to explain the "hands-on" operation of the systems. The Contractor shall furnish at least twenty (20) hours for the on-Site instruction for each of the mechanical, electrical, plumbing, heating or air conditioning, security, communications, and hardware systems and equipment. In addition, the Contractor shall provide at least twenty (20) hours of classroom instruction for each of the mechanical, electrical, plumbing, heating or air conditioning, communications, and hardware systems and equipment. The on-Site and classroom instruction as contained in this SECTION are considered a minimum requirement. If conflict exists between this requirement and the Construction Documents, the more restrictive requirement shall be followed.
 2. Review contents of the County's O&M manual with personnel in full detail to explain all aspects of operation and maintenance both in the field and in the classroom.
- C. The Contractor shall provide, in addition to the three (3) copies of the operation and maintenance manuals required for the official file, ten (10) additional copies maximum, for instructing the County personnel.
- D. Submit six (6) copies of the master schedule, training plan, and agendas for each training session for each piece of equipment and system for mechanical, electrical, plumbing, heating or air conditioning, communications, and hardware thirty days (30) prior to the estimated date of Substantial Completion for review and approval by the County.
- E. The user's operating and maintenance/user's manual, which will be used for instructional purposes, shall provide for each system the theory of operation, detailed diagrams and parts lists, preventive maintenance instruction, and corrective maintenance.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

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SECTION 017839
RECORD DOCUMENTS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This SECTION describes the requirements for maintaining records of actual conditions in the field and for changes in the Work.
- B. The purpose of final Project record documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modifications of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.

1.2 DOCUMENTS REQUIRED

- A. Maintain at the Project Site the following record documents to be turned over to the County upon closeout:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Change Orders and other modifications to the Contract.
 - 4. Field Instructions and other written instructions from the County.
 - 5. Reviewed Shop Drawings, Product Data and Samples.
 - 6. Test Reports.
 - 7. Requests for Clarification.
 - 8. Claims.
 - 9. Training records.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store record documents and samples in Contractor's Project / Field Office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
- B. File documents and samples in a manner acceptable to the County.
- C. Make documents and samples available at all times for inspection by the County or its representative.
- D. Update the documents weekly.

1.4 RECORDING

- A. Label each document "PROJECT RECORD" in neat, large, printed letters.
- B. Legibly mark drawings to record actual construction:
 - 1. Date all entries.
 - 2. Field changes of dimension and detail.
 - 3. Changes made reflecting approved changes to the Work.
 - 4. Details not on original design submittal and Construction Documents.
- C. Legibly mark each SECTION of the Specifications to record:
 - 1. Manufacturer's trade name, catalog number and supplier of each product and item of equipment installed.
 - 2. Changes made reflecting approved changes to the Work.
- D. Maintain Shop Drawings as record drawings. Legibly annotate Shop Drawings to record changes made after approval.
- E. Prior to submitting each request for payment, secure approval from the County of the current status of record documents.
- F. Periodic payments or portions thereof to the Contractor may be withheld until the County verifies that all as-built information to date has been properly recorded on Project record documents.

1.5 FINAL PROJECT RECORD DOCUMENTS

- A. Obtain approval from the County of all data recorded on the record set of prints.
- B. After Substantial Completion, carefully transfer all data shown on the job set of record drawings to the corresponding reproducible and documents in electronic media, coordinating the information as required.
- C. "Cloud" all affected areas.
- D. Stamp each record drawing with the following information:
 - 1. Project record document.
 - 2. Prepared by: Contractor's name, permanent address.
 - 3. Date prepared:
 - 4. Contractor's signature.

1.6 SUBMITTALS

- A. Submit the complete set of Project record documents to the County in hard copy (reproducible) and electronic media ten (10) days after final inspection.
- B. Participate in review meetings with the County as required.
- C. Accompany Submittal with transmittal letter as specified in SECTION 013300 "SUBMITTAL PROCEDURES". Include a signed certification that each document, as submitted, is complete and accurate.

PART 2 PRODUCTS - (Not Applicable)

PART 3 EXECUTION - (Not Applicable)

END OF SECTION

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SECTION 018100

SUSTAINABLE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Related Sections.
2. References.
3. Submittals.
4. This section includes general requirements and procedures for compliance with certain U.S. Green Building Council (USGBC) LEED® prerequisites and credits needed for the Project to obtain LEED Certified certification.
 - a. Other LEED prerequisites and credits needed to obtain LEED Certification are dependent on material selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests.
 - b. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification are dependent on the Architect's design and other aspects of the Project that are not part of the Work of this contract.

B. RELATED SECTIONS

1. Section 01 74 19 - Construction Waste Management and Disposal.

1.2 REFERENCES

- A. LEED-NC v3.0: Leadership in Energy and Environmental Design 2009 – New Construction and Major Renovations version 3.0. LEED is a national rating system for green buildings created by the US Green Building Council. All references to LEED throughout the Construction Documents shall mean LEED-NC v3.0.
- B. Reused Material: Salvaged, refurbished or reused materials, products and furnishings that have been returned to active use in the same or related capacity as their original use.
- C. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer or post-industrial), or after consumer use (post-consumer).
 1. Scraps, spills or other waste from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in the further production of the same product are not recycled materials.
 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.
- D. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles from the Project location. Manufacturing refers to the final assembly of components into the building product that is delivered and installed at the Project location.

- E. Regionally Extracted Materials: Constituent materials that are extracted, harvested or recovered (from salvage or recycling) and manufactured within a radius of 500 miles from the Project location.
- F. Rapidly Renewable Materials: Materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include products made from straw, jute, flax, bamboo, cotton, vegetable oil, wool or sunflower seed hulls.
- G. Composite Wood and Agri-fiber Board: Manufactured materials made from wood or agricultural fibers manufactured with bonding agents. Composite wood materials include particle board, OSB, MDF, strawboard, plywood and wheat board. Composite wood components used in assemblies are also controlled (e.g. door cores, panel substrates, plywood section of I-beams, etc.). Adhesive used in wood/agrifiber assemblies (veneered panels, composite wood products contained in engineered lumber, door assemblies, etc.) is not controlled in version LEED-NC (v3.0).

1.3 SUBMITTALS

- A. General: Submit additional LEED related submittals included in other Sections of the Specifications.
- B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.
- C. Project Materials Cost Data: Provide the necessary cost data requested on the LEED Materials Calculator (The Material Calculator in Excel Spread Sheet Format will be provided to contractor during construction), including the total Project materials cost and itemized costs of specific materials being tracked for LEED credits. All material costs exclude labor and equipment and the total materials cost is exclusive of Specialties, Conveying Systems and Mechanical and Electrical components. See LEED Material Calculator attached at end of this section.
- D. LEED Action Plans: Within 30 days of Notice to Proceed submit the following action plans:
 1. Credit MRc2: Construction waste management plan complying with Section 01 74 19 - Construction Waste Management.
 2. Credit IEQc3.1 & 3.2: Construction indoor air quality management plan complying with Section 01 91 01 - Construction IAQ Management.
- E. LEED Progress Reports: Concurrent with each Application for Payment, submit reports summarizing progress in construction and purchasing activities related to the following credits:
 1. Credit MRc2.1: Construction waste reduction progress reports complying with Section 01 74 19 - Construction Waste Management.
 2. Credit MRc4: Summary of product data and material costs collected for all recycled content materials that have been purchased or installed.
 3. Credit MRc5: Summary of manufacturer's information and material costs collected for all regionally manufactured materials and regionally extracted, harvested or recovered materials that have been purchased or installed.
 4. Credit IEQc3.1: Construction indoor air quality management reports complying with Section 01 91 01 - Construction IAQ Management.

5. Credit IEQc4.1: Summary of product data collected for all adhesives, sealants, paints, coatings, carpeting, and composite wood materials purchased and installed inside of the building's moisture barrier.
- F. LEED Documentation Submittals: For each Section of the Specification, submit the following for each applicable LEED Credit.
1. Credit SSc4.2: Alternative Transportation, Bicycle Storage and Changing Rooms: Cut-sheets of installed bicycle securing apparatus.
 2. Credit SSc7.2: Heat Island Effect, Roof: Cut-sheets and product data for roofing materials indicating Energy Star rating and tested initial solar reflectance, 3-year- aged reflectance (per ASTM E903-96) and emissivity (per ASTM E408-71).
 3. Credit WEc2: Innovative Wastewater Technologies: Cut-sheets for toilets and urinals indicating flush volumes (gallons/flush).
 4. Credit WEc3: Water Use Reduction: Cut-sheets for all faucets, showers, toilets and urinals indicating flow rates (gallons/minute) and flush volumes (gallons/flush).
 5. Credit EAc2: Renewable Energy: Cut-sheets for on-site renewable energy systems installed.
 6. Credit EAc4: Enhanced Refrigerant Management: Cut-sheets for HVAC equipment indicating refrigerant type.
 7. Credit MRc2: Construction Waste Management:
 - a. Comply with Section 01 74 19 - Construction Waste Management.
 - b. Construction waste management plan.
 - c. Complete LEED construction waste calculations.
 - d. Itemized waste hauling certificates/receipts for all waste removed from the Project site and documentation of recycling recovery rate for off-site sorting facilities (if waste is commingled).
 8. Credit MRc4: Recycled Content:
 - a. Cut-sheet, product literature or letter from manufacturer that clearly indicates the percentage by weight of post-consumer and pre-consumer (post-industrial) recycled content.
 - b. Material cost.
 9. Credit MRc5: Regional Materials, Extracted Regionally:
 - a. Cut-sheet, product literature or letter from manufacturer indicating the location of manufacturer and extraction, harvest or recovery of each material constituent. If only some of the constituents are extracted, harvested or recovered regionally, provide the approximate percentage by weight.
 - b. Material cost.
 10. Credit IEQc1: Carbon Dioxide Monitoring: Cut-sheets for installed carbon dioxide monitoring system.
 11. Credit IEQc3.1: Construction IAQ Management, During Construction:
 - a. Comply with Section 01 91 01 - Construction IAQ Management.
 - b. Cut-sheets indicating MERV values for filtration media used during construction and installed immediately before occupancy.
 12. Credit IEQc3.2: Construction IAQ Management, After Construction:
 - a. Narrative outlining the building flush-out procedures, including start and finish dates and mechanical system settings. If possible, provide trend log from DDC system for flush-out period.
 - b. Cut-sheets indicating MERV values for filtration media replaced after flush-out, except filters solely processing outside air.

- c. If IAQ testing is performed in place of building flush-out, provide specifications and documentation demonstrating conformance with IAQ testing procedures per credit requirements.
- 13. Credit IEQc4.1: Low-Emitting Materials, Adhesives and Sealants:
 - a. Product data and Material Safety Data Sheets (MSDS) for all adhesives and sealants used inside the building's moisture barrier indicating the Volatile Organic Compound (VOC) content of each product and verifying that each product meets the LEED requirements (Refer to "Low Emitting Materials" paragraph in Part 2). Indicate VOC content in grams/liter (g/l) calculated according to 40 CFR 59, Subpart D (EPA method 24).
 - b. List of all installed adhesives and sealants including manufacturer, quantity used in gallons and VOC content.
- 14. Credit IEQc4.2: Low-Emitting Materials, Paints and Coatings:
 - a. Product data and Material Safety Data Sheets (MSDS) for all paints used inside the building's moisture barrier indicating the VOC content of each product and verifying that each product meets the LEED requirements (Refer to "Low Emitting Materials" paragraph in Part 2). Indicate VOC content in grams/liter (g/l) calculated according to 40 CFR 59, Subpart D (EPA method 24).
 - b. List of all installed paints including manufacturer, quantity used in gallons and VOC content.
- 15. Credit EQc4.3: Low-Emitting Materials, Carpet: Cut-sheets of letter from manufacturer clearly indicating that all carpet products meet the CRI Green Label Test Program requirements.
- 16. Credit EQc4.4: Low-Emitting Materials, Composite Wood: Cut-sheets clearly indicating the bonding agents used for each composite wood and agri-fiber product used in the project and demonstrating that no added urea-formaldehyde resins are used in these products.
- 17. Credit EQc5: Chemical and Pollutant Source Control:
 - a. Cut-sheet of permanent entryway systems (grills, grates, walk-off mats, etc.).
 - b. Cut-sheet of drainage system installed in janitor's closet.
- 18. Credit EQc7.2: Thermal Comfort, Permanent Monitoring System: Cut-sheets of installed permanent temperature and humidity monitoring system.

PART 2 - PRODUCTS

2.1 LOW-EMITTING MATERIALS

- A. Credit EQc4.1: For interior applications use adhesives and sealants that comply with the following limits for VOC content when calculated according to 40 CFR 59, subpart D (EPA method 24):

<u>PRODUCT TYPE</u>	<u>VOC Limit G/L</u>
<i>Sealants</i>	
Architectural	250
Porous Architectural Sealant Primer	775
Non-porous Architectural Sealant Primer	250
<i>Architectural Adhesives Applications</i>	
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50

PRODUCT TYPE	VOC Limit G/L
Outdoor Carpet Adhesives	150
Wood Flooring Adhesives	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile installation	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50
Cove base installation	50
Multipurpose Construction Adhesive	70
Structural Glazing Adhesives	100
<i>Substrates</i>	
Metal to metal	30
Plastic foams	50
Porous material except wood	50
Wood	30
Fiberglass	80
<i>Welding & Installation</i>	
PVC welding	510
CPVC welding	490
ABS welding	400
Plastic cement welding	350
Adhesive primer for plastic	650
Contact Adhesive	80
Special Purpose Contact Adhesives	250
Structural Wood Member Adhesives	140
Sheet Applied Rubber Lining Operations	850
Top and Trim Adhesive	250
<i>Sealant Primer</i>	
Architectural (non-porous)	250
Architectural (porous)	775
Other	750
<i>Aerosol Adhesives</i>	
General purpose mist spray	65-percent VOCs by weight
General purpose web spray	55-percent VOCs by weight
Special purpose aerosol adhesives (all types)	70-percent VOCs by weight
Waterproofing concrete/masonry sealers	

- B. Credit IEQc4.2: For interior applications use paints that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24).

	VOC Limit (g/L)
<i>Interior Coatings</i>	

Non-flat	150
Flat	50
Exterior Coatings	
Non-flat	200
Flat	100
Anti-Corrosive	
Gloss	250
Semi-Gloss	250

- C. Credit IEQc4.3: Provide carpets that comply with the following limits as established by the Carpet and Rug Institute:

	Emission factor limit (mg/m²/hr)
Carpets	
Total VOCs	0.5
4 – Phenylcyclohexane	0.05
Formaldehyde	0.05
Styrene	0.4
Cushion	
Total VOCs	1
4 – Phenylcyclohexane	0.3
Formaldehyde	0.05
Styrene	0.05
Adhesives	
Total VOCs	10
Formaldehyde	0.05
2 - Ethyl - 1 – Hexanol	3

- D. Credit IEQc4.4: For all interior applications, do not use wood or agri-fiber products that contain urea-formaldehyde resin.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 019101

CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittals.
2. Construction Air Quality Management Plan
3. This Section describes construction Indoor Air Quality (IAQ) goals and includes administrative and procedural requirements for the development and execution of a construction air quality management plan.
 - a. County has established that the contractor shall prevent indoor air quality problems resulting from the construction process, to sustain long term installer and occupant health and comfort.
 - b. Protect the ventilation system components during construction and clean contaminated components after construction is complete.
 - c. Control sources of potential IAQ pollutants by controlling selection of materials and processes used in project construction.

B. Related Sections include the following:

1. Section 01 81 00 - LEED Requirements for special requirements for LEED certification
2. Division 23: Material and Equipment procedures for storage of interior materials to prevent exposure to moisture and pollutants.
3. Division 23: Basic Mechanical Requirements for duct cleaning procedures.

1.2 SUBMITTALS

A. IAQ Management Plan.

B. Photographs documenting construction IAQ management measures implemented during construction.

C. Manufacturer's Product Information stating Minimum Efficiency Reporting Values (MERV).

1.3 CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

A. Develop a Draft Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

1. During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, Chapter 3,
2. Protect stored on-site or installed absorptive materials from moisture damage.
3. Conduct a minimum two-week long building flush-out after construction ends and prior to occupancy.

- B. The SMACNA IAQ Guidelines for Occupied Buildings under Construction provides an overview of air pollution associated with construction, control measures, construction process management, quality control, communicating with occupants, and case studies. These guidelines can be accessed at www.smacna.org. Chapter 3 of the SMACNA Guidelines recommends Control Measures in five areas: HVAC protection, source control, pathway interruption, housekeeping, and scheduling. Review the applicability of each Control Measure and include those that apply in the Draft IAQ Management Plan.
1. HVAC Protection: Shut down the return side of the HVAC system whenever possible during heavy construction. If the system must remain operational during construction include the following strategies that apply:
 - a. Fit the return side of the HVAC system with temporary filters with a Minimum Efficiency Reporting Value (MERV) of 8.
 - b. Isolate the return side of the HVAC system from the surrounding environment as much as possible (e.g., place all tiles for the ceiling plenum, repair all ducts and air handler leaks).
 - c. Damper off the return system in the heaviest work areas and seal the return system openings with plastic.
 - d. Upgrade the filter efficiency where major loading is expected to affect operating HVAC system.
 - e. Clean permanent return air ductwork per National Air Duct Cleaning Association standards upon completion of all construction and finish installation work.
 - f. Install new clean media just prior to substantial completion and occupancy that has a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2.
 2. Source Control: Propose the substitution of non-toxic formulations of materials that are generally the responsibility of the contractor such as caulks, sealants, and cleaning products.
 3. Pathway Interruption: Prevent contamination of clean spaces. Include the following strategies that apply:
 - a. Use 100-percent outside air ventilation (when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30 percent and 60 percent) with air exhausted directly to the outside during installation of finishes and other VOC emitting materials.
 - b. Erect barrier between work areas or between the inside and outside of the building to prevent unwanted airflow from dirty to clean areas.
 4. Housekeeping: Reduce construction contamination in the building prior to occupancy through HVAC and regular space cleaning activities.
 - a. Store building materials in a weather tight, clean area prior to unpacking for installation.
 - b. Check for possible damage to building materials from high humidity.
 - c. Clean all coils, air filters, and fans before testing and balancing procedures are performed.
 5. Scheduling: Specify construction sequencing to reduce absorption of VOC's by construction finish materials that may act later as contaminant sources. Complete application of wet and odor-emitting materials such as paints, sealants, and coatings before installing absorptive finish materials such as ceiling tiles, carpets, insulation, gypsum products, and fabric-covered furnishings are installed.
 - a. Protect stored on-site or installed absorptive materials from exposure to moisture from precipitation, plumbing leaks, or condensation from the HVAC system to prevent microbial contamination.

- b. Conduct a two-week building flush-out with new filtration media at 100-percent outside air after construction ends and prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2. Replace filtration media used during flush-out prior to occupancy.
- C. Draft IAQ Management Plan Review Meeting: Once the County Representative and Architect have reviewed the Draft IAQ Management Plan and prior to construction at the site, schedule and conduct a meeting to review the Draft IAQ Management Plan and discuss procedures, schedules and specific requirements for IAQ during the construction and pre-construction phases of the building. Discuss coordination and interface between the Contractor and other construction activities. Identify and resolve problems with compliance to the requirements. Record minutes of the meeting; identify all conclusions reached and matters requiring further resolution.
 - 1. Attendees: The Contractor and related Contractor personnel associated with the work of this section, including personnel to be in charge of the IAQ management program, Architect, County Representative, Inspector, and such additional personnel as the Architect or County Representative deem appropriate.
- D. Final IAQ Management Plan: Make any revisions to the Draft IAQ Management Plan agreed upon during the meeting identified in item (C) above and incorporate resolutions agreed to be made subsequent to the meeting. Submit the revised plan to the County Representative for approval within 10 calendar-days of the meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 IMPLEMENTATION OF IAQ MANAGEMENT PLAN

- A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing the IAQ Management Plan for the Project.
- B. Progress Meetings: Construction related IAQ procedures shall be included in the pre-construction and construction progress meeting agendas.
- C. Distribution: The Contractor shall distribute copies of the IAQ Management Plan to the Job Site Foreman, each Subcontractor, the County Representative, and the Architect.
- D. Instruction: The Contractor shall provide on-site instruction of the IAQ procedures and ensure that all participants in the construction process understand the importance of the goals of the IAQ Management Plan.

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SECTION 019113

COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
This section includes overview of the commissioning process. (Fundamental and Enhanced Commissioning).
- B. Related Sections
 1. Section 22 08 01 - Commissioning of Domestic Hot Water System
 2. Section 23 08 00 - Commissioning of HVAC
 3. Section 26 08 00 - Commissioning of Lighting and Lighting Controls
- C. Related Documents
 1. Commissioning Plan

1.2 DESCRIPTION

- A. Commissioning
 1. This project will have selected building systems commissioned. The commissioning process will be directed by a Commissioning Agent, hired and paid for by the city.
 2. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and Owner's operational needs. This is achieved by actual verification of performance. The commissioning process encompasses and coordinates the functions of system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
 - a. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by Contractor.
 - b. Verify and document proper performance of equipment and systems.
 - c. Verify that O&M documentation is complete.
 - d. Verify that the city's operating personnel are adequately trained.
 - e. Develop a systems manual that provides operating personnel the information needed to understand and optimally operate the commissioned systems.
- B. The commissioning process does not reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product in accordance with the Contract Documents.

1.3 DEFINITIONS

- A. Basis of Design (BOD) - The basis of design is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The basis of design describes the systems, components, conditions and methods chosen to meet the intent. Some reiterating of the design intent may be included.
- B. Commissioning Agent (CxA) - An independent agent, not otherwise associated with the A/E team members or the Contractor. The CxA directs and coordinates the commissioning activities. The CxA does not take an oversight role.
- C. Commissioning Plan - An overall plan, developed before or after bidding, that provides the structure, schedule and coordination planning for the commissioning process.
- D. Contractor – Contractor and the subcontractors.
- E. Datalogging - Monitoring flows, currents, status, pressures, etc. of equipment using stand-alone dataloggers separate from the control system.
- F. Deferred Functional Performance Tests (FT) that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed.
- G. Deficiency - A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).
- H. Design Intent - A dynamic document that provides the explanation of the ideas, concepts and criteria that are considered to be very important to Owner. It is initially the outcome of the programming and conceptual design phase.
- I. Functional Completion - A specific time period (days), after substantial completion, when all remaining Testing and Balancing (TAB) and commissioning responsibilities of the Contractor, (except for seasonal or approved deferred testing and controls training), must be completed or the stipulated liquidated damages (if any) will begin accruing.
- J. Functional Performance Test (FT) - Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing is not functional testing. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The CxA develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing Contractor or vendor. FT's are performed after prefunctional checklists and start-up are complete.

- K. Indirect Indicators - Indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100-percent closed.
- L. Manual Test - Using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).
- M. Monitoring - The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of control systems.
- N. Over-written Value - Writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50-degrees F to 75-degrees F to verify economizer operation). See also “Simulated Signal.”
- O. Owner’s Project Requirements (OPR) - The city’s Project Requirements is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The County’s Project Requirements describes the systems, components, conditions, and methods chosen to meet the intent. Some reiterating of the design intent may be included.
- P. Phased Commissioning - Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.
- Q. Prefunctional Checklist (PC) - A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the Contractor. Prefunctional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.).
- R. Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.
- S. Seasonal Performance Tests - FT that is deferred until the system(s) will experience conditions closer to their design conditions.
- T. Simulated Condition - Condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).
- U. Simulated Signal - Disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.
- V. Start-up - The initial starting or activating of dynamic equipment, including executing prefunctional checklists.
- W. Test Procedures - The step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CxA.
- X. Test Requirements - Requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

- Y. Trending - Monitoring using the building control system.
- Z. Inspectors (TI) – County Inspector.

1.4 COORDINATION

- A. Commissioning Team: The members of the commissioning team consist of the CxA, County Representative, Contractor, A/E, TI, and any other installing subcontractors or suppliers of equipment.
- B. Management: The CxA coordinates the commissioning activities.
- C. Scheduling: The CxA will work with Contractor according to established protocols to schedule the commissioning activities. The CxA and TI will review the Construction Schedule and indicate when prefunctional and functional testing should occur. The Contractor will integrate all commissioning activities into the master construction schedule.

1.5 OVERVIEW OF THE COMMISSIONING PROCESS

- A. Fundamental Commissioning Process: The following narrative provides a brief overview of the Fundamental Commissioning tasks during the design and the construction phases.
 1. Commissioning during design begins with design review of the OPR, BOD, Specifications, and developing a Commissioning plan. The CxA will develop a Commissioning Plan in accordance with the Construction Schedule. The commissioning plan provides guidance in the execution of the commissioning process. The Specifications will take precedence over the Commissioning Plan if a conflict should occur.
 2. Commissioning during the construction phase consists of verifying the installation and performance of the systems by reviewing the PC and FT forms and developing a summary of the commissioning report.
 3. Fundamental Commissioning during construction begins with a scoping meeting conducted by the CxA where the commissioning process is reviewed with the commissioning team members during a scheduled weekly contractors' meeting.
 4. Additional meetings will be required throughout construction, scheduled by the CxA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems. Typically these will be part of the weekly contractors' meetings.
 5. Equipment documentation is submitted to the CxA through the normal submittal process.
 6. The full start-up and initial checkout plan shall get approval from CxA and TI.
 7. The Contractor executes and documents the prefunctional checklists. The CxA documents that the checklists were completed according to the approved plans. The CxA and TI will witness a percentage of the prefunctional tests and verify prefunctional checklists are being completed correctly.

8. The CxA develops specific equipment and system functional performance test procedures. Contractor provides assistance to the CxA in preparing the specific functional performance test procedures, when requested. Contractor shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
 9. The FT procedures are executed by the Contractor and documented by the CxA.
- B. Enhanced Commissioning Process: The following narrative provides a brief overview of the Enhanced Commissioning tasks during the design and the construction phases.
1. Commissioning review of the OPR, BOD, Specifications, and the Commissioning plan developed in the Fundamental Commissioning Process. Review design documents prior to mid-construction documents phase and back-check the review comments in the subsequent design submission.
 2. The CxA provides a review of the contractor submittals applicable to systems being commissioned in compliance with the OPR and BOD.
 3. The CxA and TI will review the O&M documentation for completeness.
 4. The CxA and TI will review the training provided by the Contractor and verify that it is completed.
 5. The CxA and TI will verify continual systems performance during the warranty period.
 6. The CxA and TI will develop a systems manual that provides future operating personnel the information needed to understand and optimally operate the commissioned systems.

1.6 RESPONSIBILITIES

- A. Commissioning Authority (CxA) Responsibilities:
1. Conduct a review of County's OPR.
 2. Conduct a review of the BOD.
 3. Assist Architects and Engineers (A/E) to develop and incorporate commissioning requirements into the construction documents.
 4. Review design documents prior to mid-construction documents phase and back-check the review comments in the subsequent design submission.
 5. Develop a commissioning plan.
 6. Coordinate and direct the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently update timelines and schedules and technical expertise.
 7. Coordinate the commissioning work with the Contractor to ensure that commissioning activities are being scheduled into the master schedule.
 8. Revise, as necessary, the construction phase commissioning plan developed during design, including scope and schedule.
 9. Plan and conduct commissioning meetings and site visits. Record and distribute trip reports. During scheduled site visits, observe component and system installations.
 10. Review Contractor submittals, applicable to systems being commissioned for compliance with the OPR and BOD.
 11. Review the pre-functional check out procedures with the Contractor.
 12. Document prefunctional checklist completion by reviewing completed prefunctional checklists and by selected site observation.

13. Review with the Contractor, the functional performance test procedures for equipment and systems. This will include manual functional testing, energy management control system trending and may include stand-alone data-logger monitoring.
14. Analyze functional performance trend logs and monitoring data to verify performance.
15. Observe functional performance tests performed by the Contractor.
16. Report all issues and correction progress in the master issues log to the County. Provide directly to County written progress reports and test results with recommended actions.
17. Compile a Commissioning Report, which shall include:
 - a. A brief summary report that includes a list of participants and roles, brief building description, overview of commissioning and testing scope, and a general description of testing and verification methods.
 - b. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented.
 - c. The issues log, commissioning plan, progress reports, a summary of the design review process, submittal and O&M manual reviews, training record, test schedules, prefunctional checklists, start-up reports, functional tests, and trend log analysis.
18. Verify that the requirements for training operating personnel and building occupants are completed.
19. Review equipment warranties.
20. Return to the site 8 to 10 months after substantial completion and review with the facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have with operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports and documents and requests for services to remedy outstanding problems.
21. Compile a Systems Manual that consists of the following:
 - a. Owner Project Requirements (OPR - by County);
 - b. Design Narrative and Basis of Design (BOD - by Designer of record);
 - c. Single line drawings and schematics for major systems developed from designer of record construction documents (by A/E);
 - d. As-builts of Control drawings and sequences of operation (by Controls Contractor);
 - e. Tables of all setpoints and implications when changing them, schedules (by Controls Contractor);
 - f. Operating instructions for integrated building systems;

- g. Recommendations for: scheduling maintenance requirements and frequency (if not already included in the project O&M manuals), scheduling for retesting of commissioned systems with blank test forms from the original Commissioning Plan, and scheduling for calibration of sensors and actuators.

B. Contractor Responsibility:

1. Include the cost of commissioning in the contract price.
2. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, O&M data and training.
3. Prepare a preliminary schedule for Divisions 21, 22, 23, and 26.
4. Notify the CxA when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and Testing Adjusting & Balancing (TAB) will occur. Be responsible to notify the CxA ahead of time, when commissioning activities not yet performed or not yet scheduled will delay construction. Be proactive in seeing that commissioning processes are executed and that the CxA has the scheduling information needed to efficiently execute the commissioning process.
5. Attend a commissioning scoping meeting and other meetings necessary to facilitate the Commissioning process.
6. Develop a full start-up and initial checkout plan. Submit to CxA for review four weeks prior to startup.
7. Perform full start-up and initial checkout and compile the check record. All site installed sensors and actuators shall be calibrated during prefunctional check by the Contractor.
8. Provide start-up for all the designated equipment. Clearly document all completed startup, prefunctional check, and system initial checkout procedures, providing a copy to the CxA.
9. Remedy deficiencies identified during start-up procedure.
10. Provide all test equipment necessary to fulfill specified testing requirements.
11. Provide additional requested documentation, prior to normal O&M manual submittals, to the CxA for development of functional testing procedures.
12. Submit the outline of the TAB plan and approach for each system and component to the CxA and TI six weeks prior to starting the TAB.
13. Assist, along with the design engineers, in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
14. Provide assistance to the CxA in preparing the specific functional performance test procedures when requested. Contractor shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
15. Perform Functional Tests (FT) and compile the FT record. This includes manual functional testing, energy management control system trending and may include stand-alone data-logger monitoring. Analyze functional performance trend logs and monitoring data to verify performance.
16. The functional testing shall include operating the system and components through each of the written sequences of operation, and other significant modes and sequences, including startup, shutdown, unoccupied mode, manual mode, staging, miscellaneous alarms, power failure, security alarm when impacted and interlocks with other systems or equipment.
17. Tests on respective HVAC equipment shall be executed, if possible, during both the heating and cooling season. However, some overwriting of control values to

simulate conditions may be required. Functional testing shall be done using conventional manual methods, control system trend logs, and read-outs or stand-alone data loggers, to provide a high level of confidence in proper system function, as deemed appropriate by the Commissioning Authority.

18. Address current A/E punch list items before functional testing. Air and water testing and balancing shall be completed with discrepancies and problems remedied before functional testing of the respective air- or water-related systems.
19. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, trends, adjustments and problem-solving.
20. Assist the CxA in interpreting the trending and monitoring data, as necessary.
21. Correct deficiencies (differences between specified and observed performance) as interpreted by the CxA and A/E and retest the equipment.
22. Report the corrected issues to CxA and reschedule testing the non-conformance items with CxA.
23. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
24. During construction, maintain as-built red-line drawings for all drawings and final CAD as-builts for Contractor-generated coordination drawings. Update after completion of commissioning (excluding deferred testing).
25. Provide training and submit the training verification report to CxA. Submit the recorded training session to the city.
26. Training shall consist of a review of the O&M manuals and hands-on training. Hands-on training shall include start-up, operation in all modes possible, including manual shut-down and any emergency procedures and preventative maintenance for all pieces of equipment. The Contractor shall fully explain and demonstrate the operation, function and overrides of any local packages controls, not controlled by the central control system. Training shall occur after functional testing is complete, unless approved otherwise by the PM.
27. Ensure the warranty package is delivered to the County and CxA. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.
28. Contractor duties are shown in Divisions 22, 23 and 26 of the specifications. Other sections of the specifications may contain duties that Contractor must perform to ensure systems are commissioned correctly.

1.7 SYSTEMS TO BE COMMISSIONED with commissioning agent (O) and without commissioning agent (X).

HVAC Equipment and System		Electrical Equipment and System	
(0)	Variable Frequency Drives	(0)	Lighting and Daylighting Control Systems
(0)	Indoor and Outdoor Units	(0)	Occupancy Sensors
(0)	Heat Recovery Units	(0)	Programming Lighting Control Panels
(0)	Evaporators and Condensers		
(0)	Air Handling Units	Plumbing System	
(0)	Exhaust, Supply and Fly Fans	(0)	Domestic Water Heater
(0)	Ductwork and Accessories		
(0)	Controls System		
(0)	Testing, Adjusting, and Balancing		
(0)	Air Terminal Units – (VAV/VVH)		
(0)	Air Inlets and Outlets		
(0)	EMCS System-(EMCS)		

1.8 A list of the Prefunctional Checklists and Functional Test forms to be used on this project.

System/Component	Prefunctional Check	Functional Testing
Variable Frequency Drives	PC 23 00 00-x	N/A
Indoor and Outdoor Units	PC 23 00 00-x	FT 23 00 00-x
Heat Recovery Units	PC 23 00 00-x	FT 23 00 00-x
Evaporators and Condensers	PC 23 00 00-x	FT 23 00 00-x
Air Handling Units	PC 23 00 00-x	FT 23 00 00-x
Fans Exhaust, Supply and Fly Fans	PC 23 00 00-x	FT 23 00 00-x
Ductwork and Accessories	PC 23 00 00-x	N/A
Controls System	PC 23 09 00-x	FT 23 09 00-x

System/Component	Prefunctional Check	Functional Testing
Testing, Adjusting, and Balancing	PC 23 00 00-x	FT 23 00 00-x
Air Terminal Units – (VAV/VVH)	PC 23 00 00-x	FT 23 00 00-x
Air Inlets and Outlets	PC 23 00 00-x	N/A
EMCS System-(EMCS)	PC 23 09 00-x	FT 23 09 00-x
Domestic Water Heater	PC 22 00 00-x	N/A
Lighting	PC 26 40 00	FT 26 40 00
Daylighting Controls	PC 26 41 00-x	FT 26 41 00-x
Occupancy Sensors	PC 26 41 00-x	FT 26 41 00-x
Programming Lighting Control Panels	PC 26 41 00-x	FT 26 41 00-x

- A. Depending upon the phasing of construction, check sheets may be copied and completed for that section of the work. Portions of the systems may be commissioned in stages. Once an entire system is completed all test sheets for that system are to be submitted for review by the CxA. Only when the entire system is completed shall the functional test of the entire system be completed.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform the full startup and initial checkout and the required full functional performance testing shall be provided by the Contractor for the equipment being tested.
- B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and shall be left on site for use by County.
- C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications.

PART 3 EXECUTION

3.1 MEETINGS

- A. During regular Contractor meetings, the CxA will be available to answer questions about the Commissioning process and assist the Contractor in the completion of prefunctional and functional test sheets.

3.2 REPORTING

- A. The CxA will provide trip reports and document the progress of the commissioning activity. Initially this will occur monthly, and in the later stages of construction will occur at least bi-weekly.

3.3 SUBMITTALS

- A. Submittal Requirements for Commissioning:
 - 1. Copies required: In addition to the submittal quantity requirements of Section 01 33 23, submit to the CxA one paper copy and one electronic copy of submittals for items to be commissioned. The paper copy will remain on site in the filing system set up by the CxA. The Contractor will maintain this filing system. The electronic copy is to be forwarded to the CxA.
 - 2. The CxA will review Contractor submittals applicable to systems being commissioned.
 - 3. Typically the commissioning submittal will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any County-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of County to keep the warranty in force clearly identified. In addition, copies of the installation checkout sheets and the field checkout sheet forms to be used by the factory or field technicians.
 - 4. Contractor shall develop a full start-up and initial checkout plan and submit to CxA for review within three months from receiving the CxA's Prefunctional Checklists.
 - 5. Contractor will provide information and services including, but not limited to, the control point lists and explanations, set points, control shop drawings, sequence of operations, trend set up, trend data, trend analysis results, and the simulated conditions and assumptions. All interlocking systems shall be trended and analyzed at one time. All information should be submitted in electronic file format.
- B. Submittal Requirement for Control Drawings:
 - 1. The Contractor's submittals of control drawings shall include complete detailed sequences of operation for each piece of equipment, regardless of the completeness and clarity of the sequences in the specifications. They shall include:
 - a. An overview narrative of the system (1 or 2 paragraphs) generally describing its purpose, components and function.
 - b. All interactions and interlocks with other systems.
 - c. Detailed delineation of control between any packaged controls and the building automation system, listing what points the Building automation

System (BAS) monitors only and what BAS points are control points and are adjustable.

- d. Written sequences of control for packaged controlled equipment. (Equipment manufacturers' stock sequences may be included, but will generally require additional narrative).
- e. Start-up sequences.
- f. Warm-up mode sequences.
- g. Normal operating mode sequences.
- h. Unoccupied mode sequences.
- i. Shutdown sequences.
- j. Trend capability and archive capacity.
- k. Capacity control sequences and equipment staging.
- l. Temperature and pressure control: setbacks, setups, resets, etc.
- m. Detailed sequences for all control strategies, e.g., economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
- n. Effects of power or equipment failure with all standby component functions.
- o. Sequences for all alarms and emergency shut-downs.
- p. Seasonal operational differences and recommendations.
- q. Initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other control settings or fixed values, delays, etc., that will be useful during testing and operating the equipment.
- r. Schedules, if known.
- s. To facilitate referencing in testing procedures, all sequences shall be written in small statements, each with a number for reference. For a given system, numbers shall not repeat for different sequence sections, unless the sections are numbered.
- t. A key to all abbreviations.
- u. Graphic schematic depictions of the systems and each component.
- v. The system and component layout of any equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
- w. A full points list.

C. Submittal Requirement for TAB Plan:

1. Submit the TAB plan to the CxA and TI six weeks prior to starting the TAB. The Contractor's submittals of the outline of the TAB plan shall include:
 - a. Certification that the TAB Contractor has reviewed the construction documents and the systems with the design engineers and Contractor to sufficiently understand the design intent for each system.
 - b. An explanation of the intended use of the building control system. The Contractor shall comment on feasibility of the plan.
 - c. All field checkout sheets and logs to be used that list each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - e. Final test report forms to be used.
 - f. Detailed step-by-step procedures for TAB work for each system and issue: terminal flow calibration (for each terminal type), diffuser

proportioning, branch / sub-main proportioning, total flow calculations, rechecking, diversity issues, expected problems and solutions, etc. Criteria for using air flow straighteners or relocating flow stations and sensors shall be discussed. Provide the analogous explanations for the waterside.

- g. List of all airflow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, and formulas to be used.
- h. Details of how total flow will be determined (Air: sum of terminal flows via BAS calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations. Water: pump curves, circuit setter, flow station, ultrasonic etc.).
- i. The identification and types of measurement instruments to be used and their most recent calibration date.
- j. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and provide methods to verify this.
- k. Confirmation that TAB Contractor understands the outside air ventilation criteria under all conditions.
- l. Details of whether and how minimum outside air cfm will be verified and set, and for what level (total building, zone, etc.).
- m. Details of how building static and exhaust fan / relief damper capacity will be checked.
- n. Proposed selection points for sound measurements and sound measurement methods.
- o. Details of methods for making any specified coil or other system plant capacity measurements.
- p. Details of any TAB work to be done in phases (by floor, etc.), or of areas to be built out later.
- q. Details regarding specified deferred or seasonal TAB work.
- r. Details of any specified false loading of systems to complete TAB work.
- s. Details of all exhaust fan balancing and capacity verifications, including any required room pressure differentials.
- t. Details of any required interstitial cavity differential pressure measurements and calculations.
- u. Plan for hand-written field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
- v. Plan for formal progress reports (scope and frequency).
- w. Plan for formal deficiency reports (scope, frequency and distribution).

D. Required format for Electronic Copies:

- 1. Drawings: AutoCad 2008 or later version.
- 2. Written Materials: Microsoft Word or Adobe PDF.
- 3. Manuals/Submittals: Adobe PDF.

E. The CxA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

- F. An updated as-built version of the control drawings and sequences of operation shall be included in the final controls O&M manual submittal. The Contractor shall keep the CxA informed of all changes to this list during programming and setup.

3.4 START-UP, PREFUNCTIONAL CHECKLISTS

- A. General. Prefunctional checklists are important to ensure that the equipment and systems are hooked up and operational. They ensure that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
- B. Full Startup and Initial Checkout Plan: The CxA will assist the Contractor in developing detailed startup plans for all equipment. The primary role of the CxA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures and prefunctional checklists are incorporated by Contractor.
 - 1. The CxA adapts, if necessary, the representative Prefunctional Checklists and procedures from the related sections. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.
 - 2. The CxA provides these checklists and tests to the Contractor.
 - 3. The Contractor develops the full startup plan by combining (or adding to) the CxA's checklists with the manufacturer's detailed startup and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the front of the plan. The full startup plan could consist of something as simple as:
 - a. The CxA's Prefunctional Checklists.
 - b. The manufacturer's standard written startup procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 - c. The manufacturer's normally used field checkout sheets.
 - 4. The Contractor submits the full startup plan to the CxA for review and approval within three months from receiving the CxA's Prefunctional Checklists.
 - 5. The CxA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
- C. Sensor and Actuator Calibration
 - 1. All field-installed temperature, relative humidity, CO, CO₂ and pressure sensors and gauges, flow sensor and meters, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described below. Alternate methods may be used if approved by the CxA beforehand. All test instruments shall have had a certified calibration within the last 12 months. Sensors installed in the unit at the factory with calibration certification provided need not be field-calibrated.
 - 2. All procedures used shall be fully documented on the Prefunctional Checklists or other approved forms, clearly referencing the procedures followed and written documentation of initial, intermediate, and final results.
 - 3. 1Sensor Calibration Methods

- a. All Sensors: Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable are grounded only at one end. For sensor pairs that are used to determine a temperature or pressure difference, make sure they are reading within 0.2-degrees F of each other for temperature and within a tolerance equal to 2-percent of the reading of each other for pressure. Tolerances for critical applications may be tighter.
- b. Sensors Without Transmitters-Standard Application: Make a reading with a calibrated test instrument within 6-inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gauge, or BAS) is within the tolerances in the table below of the instrument-measured value. If not, install offset in BAS, calibrate or replace sensor.
- c. Sensors With Transmitters-Standard Application: Disconnect sensor. Connect a signal generator in place of sensor. Connect ammeter in series between transmitter and BAS control panel. Using manufacturer's resistance-temperature data, simulate minimum desired temperature. Adjust transmitter potentiometer until the ammeter reads 4 mA. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the BAS. Record all values and recalibrate controller as necessary to conform to specified control ramps, reset schedules, proportional relationship, reset relationship, and P/I reaction. Reconnect sensor. Make a reading with a calibrated test instrument within 6-inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gauge, or building automation system) is within the tolerances in the table below of the instrument-measured value. If not, replace sensor and repeat. For pressure sensors, perform a similar process with a suitable signal generator.
- d. Critical Applications: For critical applications (process, manufacturing, etc.) more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

4. Tolerances, Standard Applications:

Sensor	Required Tolerance (+/-)	Sensor	Required Tolerance (+/-)
Cooling coil, chilled and condenser water temps	0.4-degrees F	Water flow rates and Relative humidity	4-percent of design
AHU wet bulb or dew point	2.0-degrees F		
Outside air, space air, duct air temps	0.4-degrees F		
Pressures, air and water	3-percent of design	Steam flow rate	3-percent of design
Flow rates, air	10-percent of design	Barometric pressure	0.1-in. of Hg

5. Valve and Damper Stroke Setup and Check

- a. EMS Readout: For all valve and damper actuator positions checked, verify the actual position against the BAS readout.
- b. Set pumps or fans to normal operating mode. Command valve or damper closed, visually verify that valve or damper is closed and adjust output

zero signal as required. Command valve or damper open, verify position is full open and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position doesn't reasonably correspond, replace actuator or add pilot position indicator (for pneumatics).

- c. All procedures used shall be fully documented on the Prefunctional Checklists or other approved forms, clearly referencing the procedures followed and written documentation of initial, intermediate, and final results.

D. Execution of Prefunctional Checklists and Startup

1. Four weeks prior to startup, the Contractor schedules startup and checkout with CxA and the Commissioning Team. The performance of the Prefunctional checklists, startup and checkout are directed and executed by the Contractor. When checking off Prefunctional Checklists, signatures may be required of other Contractors for verification of completion of their work. No sampling strategy is allowed for Prefunctional Check and Startup.
2. The CxA will, at his/her own discretion, observe the Prefunctional check procedures of the equipments.
3. The Contractor shall execute startup and provide the CxA with a signed and dated copy of the completed startup and construction tests and checklists.
4. Only installing individuals who have direct knowledge that a line item task on the Prefunctional Checklist was actually performed shall initial or check off that item.

E. Deficiencies, Non-Conformance and Approval in Checklists and Startup

1. The Contractor shall clearly list any outstanding items of the initial startup and construction procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CxA within two days of test completion.
2. The CxA reviews the report and submits either a non-compliance report or an approval form to the Contractor. The Contractor shall correct and retest deficiencies or uncompleted items. The Contractor shall correct all areas that are deficient or incomplete in the Prefunctional Checklists and Tests in a timely manner, and shall notify the CxA as soon as outstanding items have been corrected and resubmit an updated startup report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CxA recommends approval of the execution of the checklists and startup of each system to the A/E and County's Representative using a standard form.
3. Items left incomplete, which later cause deficiencies or delays during functional testing, will result in back charges of time for additional testing and witnessing by the CxA and Commissioning Team members to the Contractor.

3.5 PHASED COMMISSIONING

- A. When startup and initial checkout are required to be executed in phases, this phasing will be planned and scheduled in a coordination meeting of the CxA, the Commissioning Team and the Contractor.

3.6 FUNCTIONAL TESTING

A. Objectives and Scope:

1. The objective of functional testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functionally testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
2. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.

B. Test Methods:

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. Division 23 Sections and other Sections specify which methods shall be used for each test. The CxA may substitute specified methods or require an additional method to be executed other than what was specified. The CxA will determine which method is most appropriate for tests that do not have a method specified.
2. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
3. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable, e.g., for the above case, by heating the outside air sensor with a hair dryer rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers, and devices shall have been calibrated.
4. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
5. Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55-degrees F, when the outside air temperature is above 55-degrees F, temporarily change the lockout setpoint to be 2-degrees F above the current outside air temperature.
6. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during construction testing.

7. Setup: Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.
8. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. The specific recommended sampling rates are specified with each type of equipment in Divisions 22, 23, and 26. It is noted that no sampling by Contractor is allowed in construction checklist execution.
 - a. A common sampling strategy referenced in the Specifications as the “xx-percent Sampling—yy-percent Failure Rule” is defined by the following example.
 - 1) xx = the percent of the group of identical equipment to be included in each sample.
 - 2) yy = the percent of the sample that if failing, will require another sample to be tested.
 - b. The example below describes a 20 -percent Sampling - 10 -percent Failure Rule.
 - 1) Randomly test at least 20 -percent (xx) of each group of identical equipment. In no case test less than three units in each group. This 20 -percent, or three, constitute the “first sample.”
 - 2) If 10-percent (yy) of the units in the first sample fail the functional performance tests, test another 20 -percent of the group (the second sample).
 - 3) If 10-percent of the units in the second sample fail, test all remaining units in the whole group.
 - 4) If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the contractor to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.

C. Coordination and Scheduling: The Contractor shall provide sufficient notice to the Commissioning Team regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The Contractor will schedule functional tests through the TI, A/E, and CxA. The CxA and TI shall witness and document the functional testing of all equipment and systems. The Contractors shall execute the tests.

1. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. The control system is sufficiently tested and approved by the CxA before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the

proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

- D. Problem Solving: The CxA will recommend solutions to problems found; however, the burden of responsibility to solve, correct, and retest problems is with the Contractor and A/E.

3.7 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation

- 1. The CxA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the TI for review and approval and to Contractor for review.

B. Non-Conformance:

- 1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the TI and Contractor on a standard non-compliance form.
- 2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
- 3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
- 4. Any required retesting shall not be considered a justified reason for a claim of delay or for a time extension.
- 5. Cost of Retesting.
 - a. The cost for the Contractor to retest a construction or functional test, if they are responsible for the deficiency, shall be theirs.
 - b. For a deficiency identified, not related to any prefunctional checklist or startup fault, the following shall apply: The CxA will direct the retesting of the equipment once at no "charge" to the Contractor for their time. However, the CxA's time for a second retest will be charged to the Contractor.
 - c. The time for the CxA to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the Contractor.

3.8 OPERATION AND MAINTENANCE MANUALS

A. O&M Manuals:

- 1. Contractor duty for the specific content and format requirements for the standard O&M manuals are detailed in Division 01. Special requirements for the controls Contractor and TAB Contractor are found in Division 23.
- 2. A/E Contribution. The A/E will include in the beginning of the O&M manuals a separate section describing the systems including: The design intent narrative prepared by the A/E, updated to as-built status by the A/E. Simplified professionally drawn single line system diagrams on 8 ½-inch x 11-inch or 11-inch x 17-inch sheets. These shall include chillers, water system, condenser water system, heating system, supply air systems, and exhaust systems. These

shall show major pieces of equipment such as pumps, chillers, boilers, control valves, expansion tanks, coils, service valves, etc.

3. CxA Review. Prior to substantial completion, the CxA shall review the O&M manuals, documentation and redline as-builts for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the Contractor, TI or A/E, as requested. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E's review of the O&M manuals according to the A/E's contract.

B. Special Control System O&M Manual Requirements. In addition to documentation that may be specified elsewhere, the Contractor shall compile and organize at a minimum the following data on the control system in labeled 3-ring binders with indexed tabs.

1. Three copies of the controls training manuals in a separate manual from the O&M manuals.
2. Operation and Maintenance Manuals containing:
 - a. Specific instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system.
 - b. Full as-built set of control drawings.
 - c. Full as-built sequence of operations for each piece of equipment.
 - d. Full points list. A listing of all rooms shall be provided with the following information for each room:
 - 1) Floor
 - 2) Room number
 - 3) Room name
 - 4) Air handler unit ID
 - 5) Reference drawing number
 - 6) Air terminal unit tag ID
 - 7) Heating and/or cooling valve tag ID
 - 8) Minimum cfm
 - 9) Maximum cfm
 - e. Full print out of all schedules and set points after testing and acceptance of the system.
 - f. Electronic copy on disk of the entire program for this facility.
 - g. Marking of all system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.
 - h. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
 - i. Control equipment component submittals, parts lists, etc.
 - j. Warranty requirements.
 - k. Copies of all checkout tests, other than commissioning tests, and calibrations performed by the Contractor.
3. The manual shall be organized and subdivided with permanently labeled tabs for each of the following data in the given order:
 - a. Sequences of operation
 - b. Control drawings
 - c. Points lists
 - d. Controller / module data
 - e. Thermostats and timers

- f. Sensors and DP switches
 - g. Valves and valve actuators
 - h. Dampers and damper actuators
 - i. Program setups (software program printouts)
4. Field checkout sheets and trend logs should be provided to the Contractor for inclusion in the on-site Commissioning filing system.
- C. Special TAB Documentation Requirements. The Contractor shall compile and submit the following with other documentation that may be specified elsewhere in the Specifications.
- 1. The Contractor shall mark on the drawings where all traverse and other critical measurements were taken and cross reference the location in the TAB report.

3.9 SYSTEMS MANUAL

- A. The CxA is responsible to compile a Systems Manual that consists of the following:
- 1. Owner Project Requirements (OPR - by County);
 - 2. Design Narrative and Basis of Design (BOD - by Designer of record);
 - 3. Single line drawings and schematics for major systems developed from designer of record construction documents (by Designer);
 - 4. As-builts of Control drawings and sequences of operation (by Controls Contractor);
 - 5. Tables of all set points and implications when changing them, schedules (by Controls Contractor);
 - 6. Operating instructions for integrated building systems;
 - 7. Recommendations for scheduling maintenance requirements and frequency (if not already included in the project O&M manuals), scheduling for retesting of commissioned systems with blank test forms from the original Commissioning Plan, and scheduling for calibration of sensors and actuators.

3.10 COMMISSIONING REPORT

- A. The CxA is responsible to compile, organize and index commissioning data by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the County.
- 1. Final Report Details:
The final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition from the commissioning agent regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:
 - a. Equipment meeting the equipment specifications.
 - b. Equipment installation.
 - c. Functional performance and efficiency.
 - d. Equipment documentation and design intent.
 - e. Operator training.
 - 2. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc.

where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

3. The issues log, commissioning plan, progress reports, a summary of the design review process, submittal and O&M manual reviews, training record, test schedules, prefunctional checklists, start-up reports, functional tests, and trend log analysis.

3.11 TRAINING OF CITY PERSONNEL

- A. The Contractor shall be responsible for coordinating the operator training. Training requirements are shown in each Division and in Division 22, 23, 26, 27 and 28.
- B. The CxA shall be responsible for overseeing the content and adequacy of the training material for the commissioned equipment.
 1. The Contractor will submit a written training plan to the CxA for review prior to training. The plan will cover the following elements:
 - a. Equipment included in training
 - b. Intended audience
 - c. Location of training
 - d. Objectives
 - e. Subjects covered (description, duration of discussion, special methods, etc.)
 - f. Duration of training on each subject
 - g. Instructor for each subject
 - h. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
 - i. Instructor and qualifications
 2. For the primary HVAC equipment, the Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training.
 3. Video recording of the training sessions will be provided by the Contractor in DVD format and added to the O&M manuals. The CxA will witness the recorded sessions and review the recorded DVD.
 4. The mechanical design engineer shall be at the first training session to present the overall system design concept and the design concept of each equipment section.

3.12 DEFERRED TESTING

- A. Unforeseen Deferred Tests. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible.
- B. Seasonal Testing. During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The Contractor shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the Contractor, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing will be made.

3.13 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. The commissioning must be complete, except for functional testing and controls training, prior to Substantial Completion, unless approved in writing by the County's Representative.

3.14 PREREQUISITES TO FUNCTIONAL COMPLETION

- A. All TAB work and commissioning must be complete prior to Functional Completion, unless approved in writing by the County's Representative. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:
 1. Completed and signed start-up and prefunctional checklist documentation
 2. Requested trend log data
 3. Submission of final approved TAB report
 4. Completion of all functional testing
 5. Required training of County personnel completed and approved
 6. Submission of the approved O&M manuals
 7. All identified deficiencies have been corrected or are approved by the County
- B. The County's Representative will determine the date of Functional Completion after reviewing the CxA's recommendation for Functional Completion.
- C. Commissioning activities are non-compensable and cannot be a cause for delay claims.

3.15 WORK PRODUCTS AND RESPONSIBILITY MATRIX

- A. The commissioning process generates a number of written work products described in various parts of the Specifications. The Commissioning Plan lists all the formal written work products, describes briefly their contents, who is responsible to create them, their due dates, who receives and approves them, and the location of the specification to create them. In summary, the written products are:

Activity	GC	County	TI	A/E	CxA
OPR review		X			R
BOD review				X	R
Cx Specifications		R		X	R
Develop Cx Plan	R	R		R	X
Submittal Review	X			X	R
O&M Manual	X	R	V	R	R
Coordinate Cx schedule	X		V		R
Review test procedure and prepare Full Startup Plan	X				X

Activity	GC	County	TI	A/E	CxA
Prefunctional Check (PC) – Full Startup	X		V		R
Compile PC Record	X		V	R	R
Issues Log (PC & FT)	R	R	V	R	X
Forms Log (PC & FT)	R		V		X
Review test procedure and prepare Full Functional Test Procedure	X		V	R	X
Functional Test (FT) – Full Functional Test	X		V		W
Compile FT Record	X		V	R	R
Sign Off (PC and FT)	X	X	X1	X	X
Cx Report		R			X
Systems Manual		R		R	X
Training Enhanced Commissioning	X	R	V	X	R
Warranty (deferred & seasonal test/correction)	X	R	W		R

Notes:

This table shows only responsibilities for major activities. See the Cx Plan and Specifications for additional responsibilities. In case of conflict, the Cx Specifications govern.

- X = Primary Responsibility
- R = Review of documents and comments.
- W = Witness of the tests/training.
- V = Verification

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SECTION 024100

DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. General requirements for utility/site demolition, clearing and grubbing, utility disconnection, salvage/protection of existing utilities.
- B. Related sections:
 - 1. Section 31 11 00 – Clearing and Grubbing.
- C. References
 - 1. California Stormwater Quality Association (CASQA) Construction Best Management Practices (BMP) Manual (“CASQA Manual”), latest edition.
 - 2. California Green Building Code (“CalGreen”), latest edition.
 - 3. “Monterey County, San Lucas Library Property, Analysis of Brownfield Cleanup Alternatives” prepared by Weston Solutions, July 2013, hereinafter referred to as “Brownfield Report”.

1.2 ENVIRONMENTAL REQUIREMENTS

- A. Burning is not permitted.
- B. Refer to the Project Plans and the CASQA Manual for specific erosion and sediment control requirements, including dust control.
- C. Refer to the “Monterey County, San Lucas Library Property, Analysis of Brownfield Cleanup Alternatives” prepared by Weston Solutions, July 2013, for hazardous soil material abatement and removal requirements.
- D. Storm water containment and treatment shall be required to meet all Local, State, and Federal regulations.

1.3 SUBMITTALS

- A. Submit plan for debris removal and disposal. An approved demolition procedure submittal shall be prepared and available at least 14 days prior to the start of demolition. The procedures shall provide for safe conduct of the Work, careful removal/abandonment/salvage and disposition of materials and equipment, protection of facilities which are to remain undisturbed, coordination with existing facilities to remain in service, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each part of the operation, and the sequence of operation.
- B. The Contractor shall provide written authorization from disposal site owner where material shall be disposed.

- C. Submit plan and certifications for hazardous materials abatement, treatment, and soil removal, including final landfill location for soil disposal.
- D. Submit safety plan.
- E. Submit utility disconnect plan. The Contractor shall have an approved utility disconnect plan at least 14 days prior to the start of the disconnect work. The plan shall demonstrate the Contractor's methods and sequencing to ensure that utilities to each structure or utility have been disconnected as required. The Contractor shall also advise the Owner Representative in writing at least 72 hours in advance of the time of any deactivation of or connection to existing utilities, which are to be removed, abandoned, modified, or connected to the new work. The Contractor shall be responsible for coordinating this work with the appropriate authorities such as but not limited to Local Utility District and PG&E.
- F. Submit utility disconnect certifications.

1.4 DEMOLITION, SALVAGE, ABANDONMENT, AND REMOVAL COORDINATION

- A. The Contractor shall note that the Contract Documents used to indicate demolition are based on record information. Prior to the submittal of bids the Contractor shall conduct a comprehensive survey of the facilities to verify the scope of the Work, the extent of the utilities, and the physical sequencing constraints.
- B. The Contractor shall carefully coordinate the extent of the demolition in areas where existing utilities shall be reconnected to new facilities where existing facilities shall remain operational, and where vegetation/plants/trees and curb/gutter shall be restored.
- C. While the Work is being performed, the Contractor shall provide adequate access to all Owner's Representatives, other Contractors, and utility personnel for routine operation and maintenance.
- D. The Contractor shall coordinate all demolition, removal, abandonment, and salvage with the Owner's Representative.
- E. Verify that native excavated material to be reused as backfill meets specified requirements and is acceptable to Owner's Representative.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATION

- A. Determine with the Owner Representative existing vegetation life, utilities, structures, fencing and elements to remain.
- B. Protect existing buildings, fencing, utilities, roads, and improvements that are to remain. The Contractor shall provide temporary chain link fencing within 10 feet of the limits of Work.

- C. Protect existing trees, shrubbery and other vegetation that is to remain. The Contractor shall provide protective orange fabric fencing around all trees to remain within the limits of Work and up to 50 feet outside of the limits of Work.
- D. Before beginning any cutting, trenching or demolition work, the Contractor shall carefully inspect the existing facilities and examine the Contract Documents to determine the extent of the Work. The Contractor shall take all necessary precautions to prevent damage to existing facilities which are to remain in place and/or in operation. The Contractor shall carefully coordinate the Work of this Section with all other work and shall provide shoring, sheeting, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this Contract. The Contractor shall remove all temporary protection when the Work is complete or when so authorized by the Owner Representative.
- E. The Contractor shall carefully consider all bearing loads and capacities for placement of equipment and materials on site. In the event of any questions as to whether an area to be loaded has adequate bearing capacity, the Contractor shall determine the case prior to the placement of such equipment or material.
- F. The Contractor is advised that the City of San Lucas has selected Option 3 of the Brownfield Report, which includes but is not limited to removal of all hazardous soils present on-site as a part of the Work. The Contractor is cautioned that the limits of soil removal within the Brownfield Report as well as the Project Plans are diagrammatic. The Contractor shall meet with the City of San Lucas and the jurisdictional authority for hazardous soils removal to determine the exact limits of soil removal, as well as coordination of soil stockpiling and testing per the report.
- G. Concrete pavement, asphalt pavement, concrete curb and gutter shall be removed as necessary to perform the specified Work. The limits of removal shall be sawcut prior to breaking the portion to be removed. Care shall be taken not to damage the existing items/features that are determined to remain.
- H. Perform site observations as the Work progresses to detect hazards resulting from demolition activities.

3.2 UTILITIES

- A. Verify utility locations and conditions before beginning demolition. Mark locations of utilities.
- B. Supply Owner's Representative with proper notification for disconnection and capping of utilities.
- C. Abandon site septic tank and associated piping per the California Plumbing Code requirements.
- D. Utilities to be abandoned in place shall be filled (either by pumping or gravity) with slurry cement backfill containing a minimum of two sacks of cement per cubic yard of mixture. Pipes shall be plugged at both ends with mortar not less than 6 inches thick.

- E. For buildings that are to be demolished, utility services shall be shut off, capped, or otherwise controlled at the sidewalk, pavement, or other point identified on the Drawings before starting demolition. Utilities shall be removed back to the locations as shown on the Drawings. Pull electrical or telecom wiring from service conduits back to source, and remove the wiring downstream.
- F. Maintain and protect existing utilities to remain in service before proceeding with demolition, providing bypass connections to other parts of the building.
- G. Where equipment or devices have been removed, and where the active side of the pipe remains, Contractor shall cap or plug all abandoned piping using either threaded or soldered fittings. Do not rely on the existing valves for a positive shutoff.

3.3 DEMOLITION REQUIREMENTS

- A. Do not begin demolition until the Demolition Plan has been accepted.
- B. The use of explosives is prohibited.
- C. Conduct demolition to minimize interference with adjacent structures.
- D. Cease operations immediately if adjacent structures appear to be in danger. Notify the Owner's Representative. Do not resume operations until directed.
- E. Conduct operations with minimum interference to public or private accesses. Maintain egress and access at all times.

3.4 BUILDING DEMOLITION

- A. Perform demolition work in accordance with the Site Demolition Plan and the Contract Documents. Disposal of all materials shall be performed in compliance with all applicable Local, State, and Federal codes, regulations, and requirements.
- B. Conduct demolition operations and remove debris to prevent injury to people and damage to adjacent buildings and site improvements.
- C. Perform Work in such a manner as to prevent damage to existing facilities to remain or to be salvaged. Hazardous Work shall not be left standing or hanging, but shall be knocked or pulled down to avoid damage or injury to employees or the public.
- D. Confine demolition work and equipment access to the construction areas shown on the Drawings.
- E. Demolish and remove designated items.
 - 1. Completely remove foundations, slabs, pads, piping, utilities, landscaping, and other designated components.
 - 2. Demolition shall include necessary excavation for removal.
- F. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. 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.
 - 2. Maintain adequate ventilation when using cutting torches.
 - 3. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 4. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors or framing.
- G. Unless otherwise directed, all excavations resulting from demolition of structures and their associated foundations shall be backfilled to drain and match adjacent grades with fill material compacted in accordance with Section 31 20 00 – Earth Moving.
- H. Clean up, re-grade and prepare areas as shown.
- I. Concrete: Demolish in sections. Cut full depth at junctures with construction to remain and at regular intervals, using power-driven saws, then remove concrete between saw cuts.
- J. Backfill open areas and holes 4617 as a result of demolition in accordance with Section 31 20 00.
- K. Rough grade and compact areas affected by demolition to slopes shown on the Drawings.
- L. Remove temporary work such as shoring and bracing.

3.5 SITE DEMOLITION

- A. Perform demolition work in accordance with the Site Demolition Plan and the Contract Documents. Disposal of all materials shall be performed in compliance with all applicable Local, State, and Federal codes, regulations, and requirements.
- B. Demolish and remove designated items. Remove or abandon all underground utilities as noted. Utility removal shall extend at least 1 foot beyond the interior demolition limit line. All abandoned utilities beyond the removal area shall be capped or plugged with concrete per the Contract Documents.
- C. Perform clearing and grubbing in accordance with Section 31 11 00.
- D. Dispose of designated items at an approved off-site location.
- E. Clean up, re-grade and prepare area as required.
- F. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways and drainages, according to requirements of authorities having jurisdiction. Install erosion and sediment control measures in accordance with the Project Drawings.
- G. Pavement Removal:
- 1. Asphalt concrete or concrete on roads shall be saw cut before excavation. Cutting with a spade or jackhammer or grader-mounted wheel will not be allowed. Armor coats on roads shall be cut with a suitable tool before excavation. Breaking of asphalt, concrete or armor coats with excavation equipment will not be permitted.
 - 2. All edges of asphalt concrete, concrete or armor coats shall be cut vertically, with a neat, square edge to a depth of 6 inches.

3. In all cases, existing asphalt paving, concrete, or armor coating shall be saw cut after construction and just prior to final paving to a point 6 inches or wider than each side of the trench line. Saw cuts shall parallel or be perpendicular to center line of the trench.
 4. Removal of existing pavement shall be performed in such a manner as to prevent chipping or spalling of the existing pavement that is to remain in place. Excess paving shall be disposed of and shall not be used as backfill material, unless otherwise noted.
- H. Openings in water-bearing structures such as manholes and concrete boxes shall be made with care not to damage the remaining structure. Edges shall be sawcut prior to breaking the portion to be removed. All gaps shall be sealed with nonshrink grout to be watertight. Reinforcement shall be as required, or as shown in the Contract Documents. In all locations where the surface of the grout will be exposed to view, the nonshrink grout shall be recessed to approximately 1/2 inch back of the exposed surface and the recessed area filled with cement mortar grout.

3.6 UTILITY DISCONNECTION

- A. Coordinate with the Owner's Representative for the isolation of the project site utilities from overall site utilities. Contractor shall coordinate to eliminate the loss of utility service, including gas, electric, telephone, water, sewer or storm drainage, to active areas of the overall site utilities and ancillary facilities.
- B. If existing natural gas lines are present, the utility disconnect plan shall include the Contractor's plan to ensure natural gas lines have been removed or abandoned and purged of natural gas. The Contractor is cautioned that the natural gas line removal and purging process is dangerous and precautions shall be exercised.
- C. Disconnect Certification
 1. Electric: Contractor shall submit certification for each building to be demolished and every electric line to be removed either shown on the plans or discovered during the Work has been permanently isolated from the electrical grid. Certification shall be performed and signed by a journeyman electrician.
 2. Natural Gas: If required, the Contractor shall submit certification that natural gas service has been permanently isolated from each building or structure to be demolished and every natural gas line either shown on the plans to be removed or discovered during the Work has been permanently isolated from the live gas system and purged of explosive gases per NFPA 54.

3.7 REPAIR TO DAMAGE

- A. Any damage to remaining road improvements, utility poles, building elements to remain, and other existing facilities to remain as caused by the Contractor's operations shall be repaired at the Contractor's expense.
- B. Damaged items shall be repaired or replaced with new materials as required to restore damaged items or surfaces, equal or better pre-construction condition, as approved by the Owner Representative.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Formwork for cast-in-place concrete with shoring, bracing, and anchorage.
 - 2. Openings for other Work.
 - 3. Form accessories, sealers, and release agents.
 - 4. Form stripping.
- B. Related Sections
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.
 - 3. Section 07 90 00 - Joint Protection.

1.2 REFERENCE

- A. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. ACI 347R - Guide to Formwork for Concrete.
- C. AISC - Manual of Steel Construction [Edition].

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 and 01 33 23.
- B. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).

1.4 COORDINATION

- A. Coordinate the design, construction and installation of concrete formwork with the requirements for openings, sleeves, chases, reglets, pipes, recesses, nailers, anchors, ties, inserts and other embedded items required by other Sections.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store products subject to damage by dirt and moisture in a clean, dry location, off the ground and suitably protected.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Form materials shall be new and undamaged at start of the Work.
- B. Use flexible spring-steel forms or laminated boards to form radius bends.
- C. Form Lumber: Douglas Fir, Construction Grade, No. 2 or better, S1S2E.
- D. Plywood: Five-ply, 3/4 inch thick, APA B-B Plyform, Class I, Exterior Type with mill-oiling treatment omitted.

2.2 EARTH FORMS

- A. Where approved, vertical excavated surfaces may be used for forms for slabs on grade and grade beams, provided that the earth will stand without caving and that suitable provisions are taken to prevent raveling of top edges or sloughing of loose materials from the walls of the excavation.
- B. Where earth forms are permitted, clear dimensions as indicated shall be maintained and any over-excavation shall be filled monolithically with concrete.
- C. Construct wood edge strips at top sides of excavations.

2.3 ACCESSORIES

- A. Accessories which will be wholly or partially embedded in concrete, such as ties and hangers, shall be a commercially manufactured type, of metal; wire will not be acceptable.
- B. The portion remaining in the concrete shall leave no metal within 1 inch of concrete face and no fractures, spalls, depressions, or other surface disfigurements greater than 3/4 inch in diameter.
- C. Spreader cones on ties shall not exceed 1 inch in diameter.

2.4 FINISHES

- A. Form Sealer: Type to eliminate grain raise as a result of moisture and shall not interfere with color, bond, or subsequent treatment of concrete surface.
 - 1. Manufacturers
 - a. W.R. Meadows; Duogard II = Water-based form release agent.
 - b. BASF Construction Chemicals.; Cast-off: Nonstaining form-release agent.
 - c. EDOCO/Burke; "Form Sealer" (also known as "Kwik Koat Form Coating").
- B. Form Release Agent
 - 1. For Exposed Concrete to Receive Paint or Other Coatings: Chemically active type producing water-insoluble soaps. Release agents shall contain no petroleum solvents such as creosote, paraffin, wax or diesel oils.
 - 2. Unexposed Concrete: Any type that will not interfere with bond of applied finishes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the Owner Representative, in writing, of any conditions requiring corrective action.
- B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Whenever concrete bases or foundations are to be provided for equipment provided as part of the Work of other Sections, verify dimensions for the equipment to be provided before concrete is placed.
- B. Coordinate locations of openings, sleeves, chases, reglets, pipes, recesses, nailers, anchors, ties, inserts and other embedded items.

3.3 INSTALLATION

- A. All cast-in-place concrete shall be contained by constructed forms or stable earth forms.
- B. Design, construct, and brace formwork and temporary falsework to safely support concrete and safely hold personnel during construction operations.
- C. Construct forms of sufficient strength and rigidity to produce finished concrete of the precise size, shape, and location indicated, within the specified tolerances. Form assembly shall permit removal in proper sequence without damage to concrete.
- D. Arrange forms to permit single placement of exposed areas and panels without joints between adjacent forming materials in the same plane.
- E. Construct forms for architectural concrete full height and width between construction joints in concrete surface.
- F. Construct forms no higher than 12 inches above the top of a placement or construction joint.
- G. Construction Joints
 1. Form in accordance with requirements of Section 03 30 00.
 2. Provide a surfaced strip where construction joints intersect exposed surfaces; faces to provide straight lines at joints. Prior to subsequent placement, remove strip and tighten forms.
 3. Construction joints shall show no overlapping or offsetting of concrete surfaces and shall, as closely as possible, present the same appearance as butted plywood joints.
 4. Joints in a continuous line shall be straight and true.
- H. Provide cleanouts as required to permit inspection and thorough cleaning of loose dirt, debris, and waste material. Cleanouts shall not be apparent on concrete surfaces exposed to view in the finished Work.
- I. Chamfered Corners
 1. Chamfer exposed corners unless otherwise indicated.
 2. Obtain chamfers by placing 3/4 x 3/4-inch nonstaining moldings in forms. Provide pieces in longest lengths possible and miter joints.

- J. For surfaces exposed to view in the finished Work, forms shall be constructed of plywood.
- K. For surfaces not exposed to view in the finished Work, forms shall be lumber, form plywood, or any other suitable material.
- L. Formwork shall be clean and free of debris when concrete is placed.
- M. Forms shall be sufficiently tight to prevent leakage of water and mortar.
- N. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
- O. Locate temporary openings on forms at inconspicuous locations.
- P. Provide openings in formwork to accommodate the Work of other Sections. Accurately place and securely support items built into forms.

3.4 FINISHES

- A. Treat contact surface of plywood and lumber forms with a form sealer in accordance with the manufacturer's printed instructions.
- B. Clean surfaces and reseal before each use to ensure undamaged concrete.
- C. Do not use form oil.

3.5 TOLERANCES

- A. Construct formwork to tolerances specified in ACI 347, except that anchor bolt setting tolerances shall be in accordance with AISC Code of Standard Practice, Section 7.5.
- B. Where tighter tolerances are required to accommodate detention equipment or other items specified in other Sections, construct formwork to the most restrictive tolerance.

3.6 STRIPPING OF FORMS

- A. Strip forms using methods which will not damage concrete.
- B. Do not remove forms until concrete has attained sufficient strength to support its own weight and construction live loads to be placed thereon without damage to the structure, but not before minimum time as follows:
 - 1. Walls: Two days.
 - 2. Side Forms of Footings, Curbs, Walks, and Paving: 24 hours.
 - 3. Columns: Seven days.
 - 4. Soffits and Side Forms of Beams and Slabs: 10 days.
 - 5. Shoring: 21 days.

3.7 RESHORING

- A. Submit reshoring plan to the Owner Representative if forms are to be stripped earlier than specified above.

3.8 RE-USE OF FORMS

- A. Re-use of forming materials shall be subject to the approval of the Owner Representative, provided the material is structurally sound, free of defects and blemishes. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. In no case shall forming materials be used more than four times.
- B. Clean and repair surfaces of forms to be reused in the Work. Apply new form coating compound as specified for new formwork.
- C. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use “patched” forms for exposed concrete surfaces.

END OF SECTION

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SECTION 032000
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Reinforcing steel bars, wire fabric, and accessories for concrete and unit masonry.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 03 10 00 - Concrete Forming and Accessories.
 - 3. Section 03 30 00 - Cast-in-Place Concrete.
 - 4. Section 03 30 50 - Concrete Testing and Inspection.

1.2 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete.
- B. ACI 315 - Details and Detailing of Concrete Reinforcement.
- C. ACI 318 - Building Code Requirements for Reinforced Concrete.
- D. ASTM A82 - Steel Wire, Plain, for Concrete Reinforcement.
- E. ASTM A185 - Steel Welded Wire Reinforcement, Plain, for Concrete.
- F. ASTM A497 - Steel Welded Wire Reinforcement, Deformed, for Concrete
- G. ASTM A615 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- H. ASTM A706 - Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
- I. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- J. CRSI - Manual of Standard Practice, Edition.
- K. CRSI - Placing Reinforcing Bars, Edition.
- L. WWR-500 - Structural Welded Wire Reinforcement Manual of Standard Practice.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 and 01 33 23.
- B. Shop Drawings
 - 1. Detail reinforcement in accordance with ACI 315.
 - 2. Indicate bending and placing details of reinforcement; bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric; bending and cutting schedules; supporting and spacing devices.

- C. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).
 - 4. For Credits MRc4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content.
- D. Certificates
 - 1. Welding Certificates: In conformance with AWS D1.4.
 - 2. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
 - 3. Mill Test Report: Certified copies of reinforcement materials analysis.

1.4 COORDINATION

- A. Coordinate reinforcement with placement of formwork, anchor bolt locations, anchors, inserts, conduit, sleeves, and other items required to be cast in concrete. Ensure reinforcement will not interfere with the placement of such items, formed openings, and other Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Reinforcing steel shall be delivered from the mill in securely tied bundles, each bundle limited to one size and grade of material. Plastic or metal tags in an exposed position on each bundle shall identify the mill, the melt or heat number, and the grade and size of material. Identification of steel shall be maintained after bundles are broken.
- B. After fabrication, reinforcing steel shall be bundled and tagged for identification at the site. Tags shall identify the steel by the reinforcement item marking indicated on the approved shop drawings and the quantity of such items contained in the bundle.
- C. Segregate to maintain identification after bundles are broken.
- D. Store off the ground, protected from the elements and contaminants which could adversely affect bond.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Reinforcing Steel
 - 1. #3 Bars: ASTM A615, Grade 40 deformed low alloy steel bars, plain.
 - 2. #4 Bars and larger: ASTM A615, Grade 60 deformed billet steel bars, plain finish, unless otherwise indicated.
 - 3. Reinforcing Steel to be Welded: ASTM A706, Grade 60 deformed low alloy steel bars, plain finish.
- B. Welded Wire Reinforcement: ASTM A185 Plain Type. Provide in flat mats, rolls are not acceptable.
- C. Welded Deformed Steel Reinforcement: ASTM A497.

2.2 ACCESSORIES

- A. Wire for Ties, Stirrups, and Spiral Reinforcement: ASTM A82, minimum 16 gauge.
- B. Splice Sleeves: Steel splice sleeves conforming to requirements of ACI 318 and CBC, Chapter 19A for mechanically spliced reinforcing. Each splice sleeve shall be identified with the size, type, and manufacturer's identification imprinted on the sleeve.
 - 1. Manufacturers
 - a. Splice Sleeve North America; NMB Splice Sleeve.
 - b. Erico Products, Inc.; Lenton Interlock Rebar Splicing System.
 - c. Dayton/Richmond; US/MC - SAE Coupler Splice System.
- C. Chairs, Bolsters, Spacers, Bar Supports, and Other Accessories
 - 1. Conform to requirements of ACI 315; size and shape for strength and support of reinforcement during concrete placement conditions.
 - 2. Where portion of accessories will be within 1/2 inch of concrete surfaces exposed to the weather in the finished Work, such accessories shall be made of stainless steel.
 - 3. Use wire bar type support complying with CRSI recommendations, unless otherwise indicated.
 - 4. For slabs on grade, use supports with sand plates or horizontal runners where wetted base materials will not support chair legs.
 - 5. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are hot-dip galvanized, or plastic or stainless steel protected.
 - 6. Over vapor barriers or waterproof membranes use load-bearing bottom pads or precast concrete chairs to prevent penetration of the membrane.
- D. Welding Filler Metal
 - 1. E70XX for Grade 40 bars, low hydrogen electrodes.
 - 2. E90XX for Grade 60 bars, low hydrogen electrodes.

2.3 FABRICATION

- A. Fabrication of reinforcement items shall proceed only after approval of bar lists and shop drawings. Each unit of reinforcement shall be fabricated in accordance with the approved bar lists and shop drawings.
- B. Reinforcing steel shall be bent cold and shall not be straightened or rebent in a manner that will damage the material.
- C. Fabricate reinforcing in accordance with ACI 318 and CBC, Chapter 19A.
- D. Locate reinforcing splices in accordance with approved shop drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the Owner Representative, in writing, of any conditions requiring corrective action.
- B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Reinforcement shall be supported and fastened together to prevent displacement by construction loads or by the placement of concrete, beyond the tolerances specified in ACI 301. Sizes and dimensions of supports shall be as required to position the steel as indicated on the Drawings, the approved shop drawings, and in accordance with the minimum concrete protective covering requirements of ACI 301.
- B. Provide reinforcing bars full length, to the extent practicable.
- C. Splices in Reinforcing Bars
 - 1. Splices will be permitted only where indicated on the Contract Documents, the approved shop drawings, or as otherwise approved by the Owner Representative.
 - 2. Lapped ends of bars may be placed in contact and securely wired or may be separated sufficiently to permit the embedment of the entire surface of each bar in concrete.
 - 3. Lap bars as indicated, but no less than 24 inches.
 - 4. Stagger splices in adjacent bars.
 - 5. Sleeved Splices: Install splice sleeves in accordance with manufacturer's instructions; permitted only where indicated.
- D. Lap welded wire fabric reinforcement 12 inches at edges, unless otherwise indicated, and wire together.
- E. Obstructions: Should conduit, pipes, inserts, sleeves, or other items interfere with the placement of reinforcement, notify the Owner Representative and obtain approval of procedure before placement of concrete is started.
- F. Welding
 - 1. Do not weld reinforcement unless specifically indicated on the Drawings or directed by the Owner Representative.
 - 2. Conform to the requirements of AWS D1.4 with welding performed by AWS certified welders.
- G. Do not displace or damage vapor barrier.
- H. Accommodate placement of formed openings.
- I. Dowels shall be tied securely in place before concrete is deposited. Bending of dowels subsequent to concrete placement is not permitted.

3.3 TOLERANCES

- A. Reinforcement shall be placed within tolerances specified in ACI 301.

3.4 TESTING AND INSPECTION

- A. Testing and inspection shall be in accordance with Section 03 30 50.
- B. Obtain inspection and approval of reinforcing before concrete is placed.

3.5 CLEANING

- A. At time of concrete placement, reinforcement shall be free of coatings that could adversely affect the bond with concrete.

3.6 REPAIR AND ADJUSTMENT

- A. Misplaced bars shall not be bent.

3.7 DEFECTIVE WORK

- A. If reinforcing bars are found to be misplaced after concrete has been placed, immediately notify the Owner Representative and make no correction or cutting without the Owner Representative review and recommendations.
- B. Required repair or replacement of misplaced reinforcement will be determined by the Owner Representative.
- C. Misplaced reinforcement shall be repaired or replaced as recommended by the Owner Representative at no additional expense to the Owner.

3.8 PROTECTION

- A. Dowels extended for future construction as shown on the Contract Documents shall be protected from weather exposure.
- B. Continuously inspect and maintain reinforcement in proper position during concrete operations.

END OF SECTION

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SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Structural concrete for building and structural elements, concrete floors (supported and unsupported), and exterior concrete flatwork.
2. Expansion and contraction joint devices associated with concrete Work.
3. Equipment pads, light pole bases, flagpole bases, and thrust blocks.

B. Related Sections

1. Section 01 81 13 - Sustainable Design Requirements
2. Section 03 10 00 - Concrete Forming and Accessories.
3. Section 03 15 00 - Concrete Accessories.
4. Section 03 20 00 - Concrete Reinforcing.
5. Section 03 30 50 - Concrete Testing and Inspection.

1.2 REFERENCES

- A. ACI 117 - Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- C. ACI 301 - Specifications for Structural Concrete.
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete.
- F. ACI 305R - Hot Weather Concreting.
- G. ACI 306.1 - Cold Weather Concreting.
- H. ACI 308.1 - Curing Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- J. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures.
- K. ACI SP-66 - ACI Detailing Manual.
- L. AISC - Manual of Steel Construction.
- M. ASTM C33 - Concrete Aggregates.
- N. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.

- O. ASTM C94 - Ready-Mixed Concrete.
- P. ASTM C150 - Portland Cement.
- Q. ASTM C171 - Sheet Materials for Curing Concrete.
- R. ASTM C192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
- S. ASTM C260 - Air-Entraining Admixtures for Concrete.
- T. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- U. ASTM C330 - Lightweight Aggregates for Structural Concrete.
- V. ASTM C494 - Chemical Admixtures for Concrete.
- W. ASTM C618 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- X. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type). Filler Not Exposed to Traffic or Weather.
- Y. ASTM C1107 - Packaged Dry, Hydraulic-Cement Grout (Nonshrink0.
- Z. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- AA. ASTM D1752 - Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- BB. ASTM D6690 - Joint and Crack Sealants, Hot Applied, for Concrete and Pavements.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00, 01 33 23.
- B. Shop Drawings: Indicate locations and details of proposed construction and control joints.
- C. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).
- D. Samples
 - 1. Submit two, 6-inch long samples of expansion/contraction joint and control joint.
- E. Certificates
 - 1. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Mix Designs
 - 1. Submit separate mix design for each type of concrete specified.
 - 2. Submit certified mix designs with and without fly ash for comparison.
 - a. For further Mix Design criteria, refer to Part 2, "Mix Designs" article.
 - 3. Submit test results on three cylinders for each mix design.

- a. Prepare, age, and cure in accordance with ASTM C192.
 - b. Test at seven and 28 days in accordance with ASTM C39.
 - c. The test cylinders shall have been prepared from a batch of the proposed mix design with fly ash.
 - d. Where the 28-day tests do not meet specified strength requirements, the mix design will not be acceptable.
- G. Concrete Placement Checklist: When required by the Owner Representative, provide checklist in a form approved by the Owner Representative. Checklist to indicate items of Work that must be signed by the Contractor and the Owner Representative prior to placement of concrete.

1.4 COORDINATION

- A. Coordinate the installation of items to be embedded in concrete and provide openings in the concrete necessary for performance of Work of other Sections.
- B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.
- C. Request schedules of items specified under other Sections, but installed under this Section, in addition to templates, template dimensions, and shop drawings required for the installation of those items.
- D. Coordinate finish characteristics required by Work of other Sections with curing methods and finishing of concrete surfaces.
- E. Concrete which is to receive application of other Work shall be water-cured only, and maintained free from other formwork and curing materials, unless otherwise accepted by the OWNER Representative.

1.5 MOCK-UP AND FIELD SAMPLES

- A. Provide under provisions of Section 01 45 00.
- B. Construct and erect a field sample as follows
 - 1. For architectural concrete surfaces receiving special treatment or finish as result of formwork.
 - 2. At the requested by the Owner Representative.
- C. Sample Panel Requirements
 - 1. Sufficient size to indicate special treatment or finish required.
 - 2. Located as directed by the Owner Representative.
 - 3. Approved sample may remain as part of Work.
- D. Approved sample panel is considered basis of quality for the finished Work. Keep sample panel exposed to view for duration of Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle packaged materials in the manufacturer's original, sealed containers, each clearly identified with the manufacturer's name, and name and type of product.
- B. Store materials subject to damage by dirt and moisture in a clean, dry location, off the ground, and suitably protected.
- C. Store coarse and fine aggregates in separate, covered bins.
- D. Store bulk cement in covered bins.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Concrete: Ready-mixed, ASTM C94.
- B. Cement: ASTM C150.
 - 1. Type I, Type II, or Type V may be used if type is not indicated on Drawings.
 - 2. Type V required at all foundations, retaining walls, fence post footings, and any other concrete in contact with soil.
- C. Fly Ash: ASTM C618
- D. Aggregate: ASTM C33.
 - 1. Aggregate size for footings, grade beams and pile caps, and filling of steel piles shall be 1-1/2 inch maximum.
 - 2. Aggregate for walls, support slabs, beams, pilasters, columns, and slabs on grade shall be 1 inch maximum, and be mixed with pea gravel (minimum of 10 percent by weight, maximum of 15 percent by weight).
 - 3. All aggregate shall be of a type producing low shrinkage.
 - a. Coarse Aggregate: Granite, limestone, or Clayton blue rock.
 - b. Fines: Clean and well graded sands.
- E. Acquire cement, flyash, and aggregate from same source for all Work.
- F. Water: Potable, clean, not detrimental to concrete, containing less than 500 ppm of chlorides.

2.2 ADMIXTURES

- A. Water-Reducing Admixture: ASTM C494.
 - 1. Manufacturers
 - a. Euclid Chemical Company, Eucon WR.
 - b. Master Builders/BASF; Pozzolith 200N.
 - c. Sika Chemical Corp; Plastocrete 161.
- B. Water-Reducing and Retarding Admixture: ASTM C494.
 - 1. Manufacturers
 - a. Euclid Chemical Company; Eucon Retarder-75.

- b. Master Builders/BASF; Pozzolith 80N.
 - c. Sika Chemical Corp; Plastiment.
 - d. W.R. Grace; #WRDA-64.
- C. High Range Water-Reducing Admixture (Superplasticizer): ASTM C494.
- 1. Manufacturers
 - a. Euclid Chemical Company; Eucon 37.
 - b. Nox-crete Products Group; Plastiflow R.
 - c. W.R. Grace; # ADVA 360, Superplasticizer.
- D. Air-Entraining Admixture: ASTM C260.
- 1. Manufacturers
 - a. W. R. Grace; DARAVAIR AT 60.
 - b. Cemix Products, Ltd; Cemix A.E.A.
 - c. Master Builders/BASF; MBAE90.
- E. Accelerator: ASTM C494, Type C or E; Noncorrosive, nonchloride.
- 1. Manufacturers
 - a. Euclid Chemical Company; Accelguard 80.
 - b. Master Builders/BASF; Pozzutec 20.
 - c. W.R. Grace; Doraset 400.
 - 2. Submit test report from independent testing laboratory of results of an acceptable accelerated corrosion test method such as that using electrical potential measures, of minimum one year duration, demonstrating noncorrosive nature of product.
- F. Bonding Admixture: Acrylic latex, nonrewettable type.
- 1. Manufacturers
 - a. Euclid Chemical Company; Flex-Con.
 - b. Dayon(Burke), Conspec; Strong Bond.
 - c. Master Builders/BASF; Thoro System Products, Acryl 60.
 - d. W. R. Grace; Daraweld C.
- G. Mineral Admixture: Fly Ash Pozzolan; ASTM C618, Class F supplementary optional chemical and physical requirements of Tables 1A and 2A, except that the maximum sulfur trioxide shall be 4 percent and the maximum loss on ignition shall be 1.5 percent.
- 1. Manufacturers
 - a. Headwaters Resources; Fly Ash.
 - b. Boral Material Technologies.
 - c. The SEFA Group.
- H. Corrosion Inhibitor: ASTM C494 Type C, All reinforced (including clips and ties) concrete in contact with soil shall have a corrosion inhibitor added. The dosage rate for the corrosion inhibiting admixture shall protect the reinforcing bars in concrete from chloride concentrations as high as 7,000 ppm. If a calcium nitrite inhibitor is used, the dosage rate shall not be less than two gallons per cubic yard of concrete. The calcium nitrite inhibitor solution shall contain a minimum of 30 percent calcium nitrite. A corrosion inhibitor is not necessary in any concrete placed without embedded steel.
- 1. Manufacturers
 - a. W.R. Grace, DCI.
 - b. Sika, CNI.
 - c. Euclid Chemical Company, Arrmatect.

- I. Concrete Encasement Coloring Agent: Mix into concrete as required at the rate of 10 pounds of agent per cubic yard of concrete.

2.3 ACCESSORIES

- A. Curing Compound: Liquid membrane, ASTM C309, type I; conforming to volatile organic compound (VOC) limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, [date].
 1. Manufacturers
 - a. Creteseal.
- B. Sheet Curing Material: ASTM C171.
- C. Hardeners: Clear, nonmetallic dust-on type.
 1. Manufacturers
 - a. Basalite Concrete; Floor Hardener.
 - b. Dayton Superior; Emery Tuff.
 - c. Lambert Corp.; "Colorhard."
- D. Bonding Agent: Polyvinyl acetate, rewettable type, with visible tinted pigment to verify coverage.
 1. Manufacturers
 - a. Euclid Chemical Company; Euco-Weld.
 - b. Larsen Products Corp.; Weld-Crete.
 - c. Dayton-Superior; Concrete Bonder J41.
 - d. CGM Incorporated, Perma Weld.
- E. Bond Breaker: Nonstaining type, providing positive bond prevention.
 1. Manufacturers
 - a. Nox-Crete; Silcoseal 2000F.
 - b. EDOCO Construction Chemical; Clean Lift 90 Bond Breaker WB.
 - c. Dayton Superior Chemical; Maxi-Tilt "E" WB Bond Breaker.
- F. Structural Epoxy Bonding Adhesive: Two component, 100 percent solids compound suitable for use on dry or damp surfaces.
 1. Manufacturers
 - a. Euclid Chemical Company; Eucopoxy LPL, MV or Euco#452 Eprox System, MV.
 - b. Sika Chemical Corporation; Sikadur 32 Hi-Mod.
 - c. EDOCO Construction Chemicals; Burkepoxy MV.
 - d. Dayton-Superior; Resi-Bond J58.
- G. Nonshrink Grout: ASTM C1107; nonmetallic; capable of achieving a 95 percent bearing under a 4 by 4-foot baseplate when grout is placed at a fluid consistency.
 1. Manufacturers
 - a. Euclid Chemical Company; Euco N-S Grout, or Hi-Flow Grout.
 - b. Master Builders/BASF; Masterflow 713 plus, Masterflow 928.
 - c. EDOCO Construction; EDOCO Nonferrous Nonshrink Grout.
 - d. W.R. Meadows; "Sealtight 588" Precision Grout.
 - e. Dayton-Superior; Sure-Grip High Performance Grout.
 - f. Sika Chemical Corporation; Sika Grout 212.
- H. Injection Grout for Splice Sleeves

1. Early Strength: 3,000 psi or greater in 24 hours.
 2. Ultimate Strength: 9,500 psi or greater in 28 days.
 3. Nonshrink; capable of completely filling voids within sleeves.
 4. Manufacturers
 - a. Erico In., Lenton Interlock; Erico Hy10L Grout.
 - b. Splice Sleeve North America, Inc.; SS Mortar.
 - c. Dayton Superior, Richmond DB Grout Sleeve Splice System; DBGS Splice Grout.
- I. Patching Mortar: Epoxy type, 100 percent solids, suitable for use on damp or dry surfaces.
1. Manufacturers
 - a. Euclid Chemical Company; Euco 456 Mortar.
 - b. Sika Chemical Corporation; Sikadur 43 Patch-Pak.
 - c. EDOCO Construction Chemicals; Burkepoxy Mortar.
- J. Patching Compound for Vertical or Overhead Applications: Free flowing, polymer modified, cementitious topping.
1. Manufacturers
 - a. Euclid Chemical Company; Verticoat.
 - b. Dayton-Superior; Poly-Fast FS.
 - c. ARDEX Engineered Cement; ARDEX Poly-top.
 - d. Sika Chemical Corporation; Sikatop 121 Plus.
- K. Abrasive Aggregate for Nonslip Finish
1. Manufacturers
 - a. Euclid Chemical Company; Nonslip Aggregate.
 - b. Lambert Corp; EMAG 20.
 - c. BASF Construction Chemicals; Frictex-NS.
 - d. Dayton-Superior; Emery Nonslip.
- L. Evaporation Retardant
1. Manufacturers
 - a. Euclid Chemical Company; Eucobar.
 - b. Master Builders/BASF; Confilm.
 - c. W.R. Meadows Inc; Evapre.
 - d. Dayton-Superior; SureFilm (J-74).
 - e. Creteseal, CS2000.
- M. Clear Sealer: As specified in Section 09 61 00 for type.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile.
- B. Joint Filler Type B: ASTM D1752; Closed cell polyvinyl chloride foam, resiliency recovery of 90 percent if not compressed more than 50 percent of original thickness.
- C. Joint Filler Type C: ASTM D1752; Premolded sponge rubber, fully compressible with recovery rate of minimum 95 percent.
- D. Epoxy Joint Filler: Two component, 100 percent solids compound; minimum 50 Shore D Hardness.

1. Manufacturers
 - a. Euclid Chemical Company; Euco 700.
 - b. Metzger/McGuire Co.; MM-80.
 - c. EDOCO Construction Chemicals; Burke Reflex Joint Filler.

- E. Construction Joint Devices: Integral galvanized steel formed to tongue and groove profile, with removable top strip exposing sealant trough where indicated.

2.5 MIX DESIGNS

A. Cast-In-Place Concrete

1. Mix Designs shall be in accordance with CBC Section 1905A and ACI 318, Section 5.2.
2. Instruct Testing Agency to base mix designs on use of materials tested and approved.
3. Concrete mixes shall be designed to meet strengths specified and be of uniform density without segregation when placed.
4. Water-cement ratio which shall control the amount of total water added to concrete for the following conditions:

Concrete <u>Aggregate Size</u>	With Superplasticizer <u>W/C Ratio</u>	Without Superplasticizer <u>W/C Ratio</u>
1 inch	0.385	0.45
3/4 inch	0.375	0.44

5. Air Content
 - a. 4 to 6 percent for severe exposure such as concrete in exterior or freezing conditions.
 - b. 1.5 to 3.5 percent for mild exposure of interior condition.
6. Fly Ash
 - a. Fly ash shall be used only in mix designs with Portland cement Type II and IIA and shall not be used with high early strength Portland cement Type III.
 - b. Reduction of Portland cement, by weight, is acceptable with addition of an equal weight of fly ash provided the cement reduction is not be less than 25 percent nor more than 40 percent when compared to the mix design without fly ash.
7. Water Reducers
 - a. Use water-reducing admixtures in all concrete without superplasticizers.
 - b. Use water-reducing admixtures in all concrete with superplasticizers to allow proper mixing prior to adding superplasticizer.
8. Superplasticizers
 - a. Use type as recommended by manufacturer in the applicable temperature ranges allowed in all hydraulic structures and headworks.
 - b. Use superplasticizer in all concrete for pond structures.

- c. Accomplish variations in slump, working time, and air content for flowable mixes by increasing or reducing superplasticizer dose or air-entraining admixture dose at the ready-mix plant only. Adjust the slump or air content at the jobsite by adding admixtures for a particular load when approved by the Owner Representative, then the plant dose shall be adjusted to meet the specifications for the rest of the placement. This additional dosage at the jobsite shall be through an approved dispenser, supplied by the admixture manufacturer and otherwise at the Contractor's option.
 - d. Effect on Slump: Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of superplasticizer if it fails to maintain slump in required range.
 - e. Meet design strengths, slumps, water-cement ratio, and other requirements as specified at slump required for placement.
 - f. Use water reducers in combination with superplasticizers as required for mixing.
9. Specifically Prohibited Admixtures
- a. Admixtures containing hydrogen chloride, calcium chloride, or thiocyanates.
 - b. Admixtures containing more than 0.05 percent chloride ions.
10. Unspecified admixtures will not be permitted, unless accepted by the Owner Representative, and under condition that the Independent Testing Agency modifies mix design as necessary, and each such modification is approved by the Structural Engineer.
11. Concrete may be designed for either pump or conventional placement. If pumping will be used, the mix shall be specifically designed for pumping and shall be so designated.
12. Mix designs are subject to review. Final acceptance of materials will depend upon strength testing after placement.
- B. Nonsrink Grout: Mix in accordance with the manufacturer's printed instructions, using potable water from a domestic source.
- C. Dry Pack: Mix in proportions, by volume, one part cement to two and one half parts fine aggregate, screening out materials retained on a No. 4 sieve. Mix with water to a consistency such that, when a ball of mixture is compressed in the hand, it will maintain its shape, showing finger marks, but not showing any surface water.
- D. Patching Mortar: Mix in proportions, by volume, one part cement to two parts fine aggregate.
- 1. Design Requirements: As indicated in the Schedule in Part 4.

2.6 MIXING

- A. Batch Plant Conditions
- 1. Equipment and plant shall be capable of weighing, proper segregation and efficient handling, and shall be subject to approval. Equipment and plant processes not approved shall not be used in Work.
 - 2. Use approved automatic metering capable of determining moisture content of sand.
- B. General Requirements
- 1. Concrete mixing shall comply with CBC Section 1905A.8 and ACI 318 Section 5.8.
 - 2. Mix cement, fine and coarse aggregates, admixtures, and water to exact proportions of mix designs.
 - 3. Measure fine and coarse aggregates separately in accordance with approved method which provides accurate control and easy checking.
 - 4. Adjust grading to improve workability; do not add water, unless otherwise recommended by the Owner Representative.

5. Maintain proportions, values, and factors of approved mixes throughout Work.
- C. Admixtures: Use automatic metering dispenser to introduce admixture into mix.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the Owner Representative, in writing, of any conditions requiring corrective action.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, embeds, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- D. Verify all controlling dimensions, for the Work of this Section and related Work, by field measurement prior to start of construction.
- E. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's written instructions.
- B. In locations where new concrete is dowelled to existing work, install dowels as indicated on Contract Documents.
- C. Remove loose dirt and foreign matter from excavations and forms; remove standing water and saturated soil from excavations and from cavities. Placing concrete in standing water shall not be permitted. Hardened concrete and foreign materials shall be removed from the inner surfaces of conveying equipment.
- D. Thoroughly clean reinforcement and other embedded items free from loose rust and other objectionable matter.
- E. Thoroughly wet wood forms, except coated plywood, and adjacent concrete at least one hour in advance of placing concrete; securely close cleanout and inspection ports; repeat wetting as necessary to keep forms damp.
- F. Moisten subgrade or sand associated with under-slab vapor barrier system one day prior to placing concrete; maintain moisture until concrete placement.
- G. Maintain equipment clean and of sufficient quantity and capacity to efficiently execute the Work.
- H. Verify subgrade and forms have been checked for line and grade, and the Work areas have been observed and approved by the Owner Representative.

- I. Before depositing new concrete on or against hardened concrete, retighten forms and prepare surface of hardened concrete as follows:
 1. Concrete which has been placed longer than 6-1/2 hours: Sandblast to roughen surfaces. Thoroughly clean of foreign matter and laitance, and moisten with water.
 2. Concrete which has been placed longer than 3-1/2 hours but less than 6-1/2 hours: Remove all laitance from concrete by wire brushing.
 3. Apply bonding agent as required in accordance with manufacturer's instructions.

3.3 CONCRETE PLACEMENT

A. Transporting

1. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which prevent the separation or loss of the ingredients, in accordance with ASTM C94.
2. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped more than 4 feet.
3. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.
4. Concrete may be pumped from the transit mixer to places of deposit, provided that information on mix design adjustments, equipment data, procedures, and the entire operation are submitted for the Owner Representative's prior review.
 - a. Pumps shall be suitable for the mix, aggregate size, and slump required.
 - b. Pump operators shall be experienced in the operation of the equipment to be used.
5. Use of aluminum equipment to transport concrete is not permitted.

B. Depositing

1. Place concrete in accordance with CBC Section 1905A.10.
2. Maintain during placement or until the completion of the section, a plastic surface approximately horizontal.
3. Prevent displacement of reinforcement, anchor bolts, welding plates, and other items required to be embedded in concrete.
4. Before concrete sets, completely remove concrete spilled on forms or reinforcing steel in portions of structure not to be immediately concreted.
5. Place concrete continuously between predetermined expansion, control, and construction joints. An interruption in placing of more than 60 minutes will be cause for shutting down concrete placement operations and the wasting of remaining mixed concrete, concrete in hoppers, and concrete in mixers. In case such interruption occurs, provide construction joints where and as directed, and cut concrete back to such line, cleaning forms and reinforcing as specified herein.
6. Keep a record of the time and data of placing the concrete in each portion of the structure. Keep reports until the completion of the structure, and keep reports open to the review of the Owner Representative.

C. Consolidation

1. Thoroughly consolidate concrete by puddling with suitable tools during placement and thoroughly working around reinforcement, embedded fixtures, and into the corners of forms.
2. In addition to manual spading and tamping, internally vibrate concrete with high-speed mechanical vibrators of sufficient amplitude for adequate consolidation.
3. Vertically insert and remove hand-held vibrators at points 18 to 30 inches apart.
4. Do not use vibrators to transport concrete in forms.
5. Vibrate concrete minimum amount required for consolidation.

6. Do not vibrate concrete placed for slab on grade except at slab edges adjacent to edge forms and at items embedded in the slab.

D. Construction Joints

1. Verify location and conformance with typical details and approved shop drawings. Provide joints only where designated or accepted by the Owner Representative.
2. Construction joints shall be in accordance with CBC Section 1906A.4 and ACI 318 Section 6.4.
3. Contact surface of construction joints shall be cleaned and roughened by removing the entire surface and exposing clean aggregate solidly embedded in mortar matrix in accordance with the following procedures:
 - a. Thoroughly clean surface by sandblasting or chipping the entire surface not earlier than five days after the initial placement.
 - b. Thoroughly hose wash surface not less than two or more than four hours after concrete is placed. Wash water and chalk-like material to be removed entirely from the contact surface.
 - c. Contact surfaces of vertical construction joints in suspended slabs shall be sandblasted.
4. Prevent formation of shoulders and ledges.
5. Provide keys across vertical joints as indicated; in addition, place dowels across the joints.
6. Construction joints are required as follows:
 - a. Slabs on grade.
 - b. Construct in checkerboard fashion or in alternate strips with keyed joints.
 - c. Cast in areas small enough to prevent uncontrolled shrinkage cracking.
 - d. Slab shall be without re-entrant corners.
 - e. Sections shall have length to width ratios not exceeding 1.5 to 1.
 - f. Locate construction joints under partitions whenever possible.
 - g. Foundations, beams, walls, and framed slabs shall be placed with maximum continuous length not to exceed 60 feet.
7. Control joints shall be located between construction joints.
8. Cut control joints after concrete finishing, using Soff-Cut Systems or approved equivalent. Take necessary measures to prevent cracking.

3.4 SEPARATE FLOOR TOPPINGS

- A. Prior to placing floor topping, remove deleterious material. Broom and vacuum clean.
- B. Place required reinforcing and other items to be cast in.
- C. Apply bonding agent to substrate in accordance with manufacturer's instructions.
- D. Place concrete floor toppings to required lines and levels.

3.5 FINISHES

A. Formed Surfaces

1. Smooth Finish: Obtain by the use of plywood, sheet metal, or lined wood forms; no fins, pockmarks, and other irregularities shall be present in the exposed surfaces of concrete.
2. Scored Finish: Roughen surface in an approved manner, or etch with sharp-pointed steel tools to key or otherwise improve the mechanical bond of the surface. Such scoring or roughening shall disturb or otherwise roughen at least 10 percent of the area so scored.

3. Grout-Cleaned Finish
 - a. Prepare grout of two parts normal Portland cement, one part white cement, and 4-1/2 parts fine aggregate mixed with water to consistency of thick paint.
 - b. Wet surfaces and rub grout on surfaces using rubber or cork float so that small voids and imperfections are filled.
 - c. Allow surfaces to dry for approximately one hour, scrape off excess grout with trowel, and then rub surfaces with burlap sacks.
 - d. Keep surfaces continuously damp for 24 hours.
 - e. Provide on exposed wall surfaces, vertical surfaces of equipment foundations, and other vertical surfaces for unless otherwise indicated or specified.

- B. Unformed Surfaces
 1. Floating
 - a. Provide as first stage for flatwork finishes, unless otherwise specified.
 - b. Thoroughly consolidate areas, strike off to screeds tamp to recess large aggregate below surface level.
 - c. Fill voids, reconsolidate, and re-level surfaces as necessary.
 - d. Do not proceed with subsequent finishes until surface water has absorbed or dried off and surface sheen has become dull.
 2. Wood Float Finish
 - a. Provide as second stage for other finishes, unless otherwise specified.
 - b. Using approved floating machines or hardwood trowels, float surfaces to required planes and shapes, working just sufficiently to bring surfaces to uniform condition.
 - c. Work no more than necessary to achieve uniform texture free from irregularities and screed marks; except where receiving fills or mortar beds, leave surfaces in roughened, granular condition for good mechanical bond.
 - d. Cut and fill surfaces as necessary to true up.
 - e. When followed by other finishes, floating shall leave small amount of mortar on surfaces without excess of water.
 - f. Do not proceed with subsequent finishes until surface water has absorbed or dried off and concrete has set sufficiently to prevent fines or water from being worked to the surface.
 - g. Finish texture shall be fine-grained and granular to provide good slip resistance and shall be reasonably free from directional trowel marks.
 - h. Provide for exterior and interior surfaces of buildings, unless otherwise indicated or specified.
 3. Steel Trowel Finish
 - a. Using finishing machines or steel trowels, trowel surfaces to produce a dense, hard, smooth steel trowel finish.
 - b. Commence troweling in one pass just sufficiently to flatten floated surface.
 - c. Wait until concrete has set sufficiently; then resume steel troweling; continue and repeat as required to obtain a hard steel trowel finish, free of blemishes, ripples, and trowel marks.
 - d. Do not
 - 1) Use cement or sand dusting to absorb or otherwise remove surface water.
 - 2) Commence troweling too soon on freshly placed concrete.
 - 3) Overwork surfaces by excessive troweling in an area in one pass.
 - e. Work out lips, uneven levels, and other irregularities prior to final troweling.
 - f. Neatly tool exposed edges, expansion joints, curbs, arises, and other details.
 - g. Surface across joints shall be level and free from offsets.
 - h. Provide for interior surface not otherwise indicated or specified.

4. Broom Finish
 - a. Draw a soft-bristled push broom over an initially trowel-finished surface.
 - b. When coarser surfaces are desired, use a stiffer-bristled broom.
 - c. Broom finish shall provide a nonslip surface, even if exposed to rain.
 - d. Provide for exterior flatwork and as indicated or specified.
 - C. Concrete Hardeners and Sealers
 1. Apply in accordance with the manufacturer's printed instructions.
 2. Apply hardener at the rate consistent with the manufacturer's definition of light traffic areas.
- 3.6 CURING
- A. Curing shall immediately follow finishing and shall be accomplished for each portion of the Work.
 - B. Wall Surfaces
 1. Cure for a minimum of seven days by form-curing with forms wetted down thoroughly at least four times daily until forms are removed.
 2. If forms removed in less than seven days, follow immediately with membrane curing if outside of building, and with fog spray to maintain moist condition inside of building.
 - C. Flatwork Surfaces
 1. Water cure all concrete work, unless noted otherwise.
 2. Membrane cure exterior pavement and slab surfaces.
 3. Where hardener is approved to be used, cure in accordance with hardener manufacturer's printed instructions.
 4. Do not use liquid membrane curing compounds on surfaces to receive other finishes.
 - D. Maintain concrete temperature above 50 degrees F during curing.
 - E. Protect concrete from damage during the curing period.
- 3.7 TOLERANCES
- A. Tolerances shall be in accordance with ACI 117.
 - B. Deviation from plumb or level shall not exceed 1/8 inch within 10 feet in any direction, as determined with a 10 foot straight edge.
 - C. Anchor Bolts: Setting Tolerances shall be in accordance with AISC Code of Standard Practice, Section 7.5.
- 3.8 FIELD QUALITY CONTROL
- A. Place concrete during hot weather in accordance with ACI 305R.
 - B. Place concrete during cold weather in accordance with ACI 306R.
 - C. Do not place concrete during precipitation, unless adequate protection is provided.
- 3.9 TESTING AND INSPECTIONS

- A. Testing and inspection shall be in accordance with Section 03 30 50.
- B. Do not place concrete until reinforcing and embeds have been inspected and approved by the Owner Representative.

3.10 REPAIR AND ADJUSTMENT

- A. Immediately after removing formwork, concrete surfaces shall be examined by the Owner Representative, and pour joints, voids, rock pockets, tie holes, and similar defects shall be patched at once as directed by the Owner Representative.
- B. Submit information on patching mixture and method proposed for use to the Owner Representative for review prior to commencing repair work.
- C. Patch honeycomb, aggregate pockets, voids, and holes as follows, unless otherwise directed by the Owner Representative
 1. Chip out until sound concrete is exposed to minimum depth of one inch.
 2. Prepare patching mortar with approximately two parts normal Portland cement, one part white cement, and nine parts fine aggregate; vary proportions of cement as necessary to match color of adjacent concrete.
 3. Saturate surfaces with water and fill cavities with patching mortar.
 4. Cure patches as specified for concrete.
- D. Patching Tie Holes
 1. Cut nails and tie wires for form ties flush with the face of the concrete, and leave surfaces smooth and clean.
 2. Remove metal spreader ties on exposed concrete Work, or snap off inside the wall surface.
 3. Patch resulting cone pockets on exposed surfaces as described above.

3.11 DEFECTIVE CONCRETE

- A. Concrete not conforming to required lines, details, dimensions, tolerances, finishes, strength, or other specified requirements shall be considered defective. Concrete with excessive honeycomb or embedded debris. Notify the Owner Representative upon discovery of these conditions.
- B. With the prior acceptance of the Owner Representative, some minor defective Work may be repaired by use of cement mortar; however, if the defects are serious or affect the strength of the structure or its appearance, the Owner Representative may require the removal and replacement of that portion of the structure affected.
- C. Required repair or replacement of defective concrete will be determined by the Owner Representative.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of the Owner Representative for each individual area.
- E. Defective concrete shall be repaired or replaced as recommended by the Owner Representative at no additional expense to the Owner.

3.12 PROTECTION

- A. Provide protection in accordance with manufacturers instructions.
- B. Protect concrete from elements including sun and rain.
- C. Do not subject concrete to any loads until it is completely cured and has attained its minimum 28-day strength.
- D. Protect concrete during and after curing from damage from subsequent construction operations.
- E. Cover traffic areas with plywood sheets; maintain paper and plywood in place and in good repair for as long as necessary to protect against damage from construction operations.
- F. Keep finished areas free from traffic for a minimum of four days or as necessary until surfaces have set sufficiently to prevent damage.

3.13 SCHEDULE

- A. Unless otherwise indicated on Drawings or in other Sections, provide concrete in accordance with the following Table.

CLASS*	28-DAY COMPRESSIVE STRENGTH	MAXIMUM SLUMP**	MAXIMUM AGGREGATE SIZE****	MINIMUM CEMENT POUNDS PER C.Y.*****
Building foundations	3000	4 Inches	1-1/2 Inches	520
Slabs on Grade (Interior floor)	3000	4 Inches	1 Inch	550
Slabs on Grade (Exterior Walkways)	3000	4 Inches	3/4 Inch	550
* Air Dry Weight shall not exceed 150 pcf for normal weight concrete or 110 pcf for lightweight concrete. ** Concrete with superplasticizer designed into the mix (when permitted) shall arrive at the site without the superplasticizer at slump of 2 to 3 inches, be verified, then have superplasticizer added at the site to attain specified slump. *** Maximum aggregate size not more than 1/3 thickness of concrete component. **** Refer to Section 2.5 MIXES for W/C requirements.				

END OF SECTION

SECTION 033050

CONCRETE TESTING AND INSPECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Concrete Testing and Inspection required by other Sections.
- B. Related Sections
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

- A. ACI 221R - Guide for Use of Normal Weight and Heavyweight Aggregates in Concrete.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI 305R - Hot Weather Concreting.
- D. ACI 306.1 - Cold Weather Concreting.
- E. ACI 318 - Building Code Requirements for Reinforced Concrete.
- F. ASTM C31 - Practice for Making and Curing Concrete Test Specimens in the Field.
- G. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- H. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
- I. ASTM C42 - Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- J. ASTM C88 - Standard Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
- K. ASTM C94 - Ready-Mixed Concrete.
- L. ASTM C117 - Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing.
- M. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- N. ASTM C138 - Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
- O. ASTM C143 - Test Method for Slump of Hydraulic-Cement Concrete.
- P. ASTM C172 - Practice for Sampling Freshly Mixed Concrete.

- Q. ASTM C173 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- R. ASTM C192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
- S. ASTM C289 - Standard Test for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
- T. ASTM C495 - Test Method for Compressive Strength of Lightweight Insulating Concrete.
- U. ASTM C513 - Test Method for Obtaining and Testing Specimens of Hardened Lightweight Insulating Concrete for Compressive Strength.
- V. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- W. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
- X. ASTM F1869 - Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- Y. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- Z. Caltest 217 - Method of Test for Sand Equivalent.
- AA. ICRI Guideline No. 03739 - Guide to Using In-Situ Tensile Pull-Off Tests to evaluate Bond of Concrete.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 and 01 45 29.
- B. Independent Testing Laboratory shall submit the following:
 - 1. Testing and Inspection Reports in accordance with Section 01 45 29.
 - 2. Product Data
 - a. Certified copies of mix designs for each concrete class specified.
 - b. Ready mix delivery tickets, ASTM C94.
 - c. Certified copies of concrete reinforcement test results for tensile and bending strength.
 - d. Certified copies of concrete cylinder compressive strength test results at time intervals specified.
 - e. Certification that aggregate and gravel are asbestos-free and conform to specified gradations and characteristics.
 - f. Certification from vendor that samples originate from and are representative of each lot proposed for use.
 - g. Certification that materials meet requirements specified.

- 3. Certificates
 - a. Batch plant certification.
- C. Owner Representative will collect the following:
 - 1. Product Data
 - a. Mill test reports for reinforcing.
 - b. Ready mix delivery tickets, ASTM C94.

1.4 COORDINATION

- A. Contractor shall allow the Independent Testing Laboratory and the Owner Representative free access to places, whether on or off the job site, where materials are stored, proportioned, mixed, or fabricated; to places where equipment is stored or serviced; and to the job site during times of preparation, installation, erection, placement, curing and patching.
- B. Contractor shall supply labor, transportation, and on-site storage facilities required by the Independent Testing Laboratory and the Owner Representative for taking and preparing samples for testing.
- C. Contractor shall notify the Independent Testing Laboratory and the Owner Representative in sufficient time prior to fabrication, field welding, mixing, and placement to permit testing and inspecting without delaying the Work; minimum 48 hour notice required, unless otherwise noted.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. The Independent Testing Laboratory shall inspect concrete plant prior to Work to verify following:
 - 1. Plant is equipped with approved metering devices for determining moisture content of fine aggregate.
 - 2. Plant quality controls are adequate.

3.2 GENERAL

- A. Materials and testing thereof shall comply with ACI 318.
- B. Test and inspect in accordance with CBC Chapter 17A and 19A and as specifically outlined in Sections 1704A, 1903A, and 1916A.

3.3 CONCRETE REINFORCING

- A. Independent Testing Laboratory shall provide the following testing:
 - 1. Material Samples
 - a. Test for tensile and bending strength in accordance with CBC Chapter 19A.
 - b. Where positive identification of the heat number and mill certificates cannot be made, two specimens from each 2-1/2 tons, or fraction thereof, of each size and grade shall be tested.

2. Welded Reinforcement
 - a. Perform chemical analysis of reinforcing to be welded if mill certificates not available. Carbon equivalent shall be below 0.75 for reinforcing to be welded.
 - b. Perform field test on minimum one weld within each 25 welds. Conduct nondestructive field test (radiographic or ultrasonic for butt welds, magnetic particle for fillet welds) for welds indicated.
- B. Owner Representative will provide the following inspections:
 1. Inspect materials tags and mill certifications.
 2. Inspect placement of all reinforcement for conformance with Drawings and approved shop drawings to confirm size, spacing, and installation.
 3. Welded Reinforcement
 - a. Verify welder's certification, materials, and equipment.
 - b. Perform visual inspection of welding.

3.4 CONCRETE AGGREGATE

- A. Independent Testing Laboratory shall provide testing and inspection per Table 5.1 of ACI 221R.

3.5 CONCRETE

- A. Independent Testing Laboratory shall provide the following testing:
 1. Perform testing in accordance with ACI 318.
 2. Test slump of concrete in accordance with ASTM C143.
 3. Test compressive strength in accordance with CBC Chapters 19A and as follows:
 - a. Make and cure specimen cylinders in accordance with ASTM C31 for each class placed at site as directed by the Owner Representative.
 - b. Frequency of testing shall be in accordance with CBC Section 1905A.6.2.
 - c. Retain one cylinder for 7 day test, one for 14 day test and three for 28 day test. Hold one cylinder for subsequent testing, if necessary.
 - d. Number each cylinder 1A, 1B, 1C, 1D, 1E, 1F, 2A, 2B, 2C, etc.; date each set; and keep an accurate record of placement on what each set represents.
 - e. Transport specimen cylinders from job to laboratory.
 - f. Test specimen cylinders at age 7, 14, and 28 days for specified strength in accordance with ASTM C39.
 4. Take core specimens of hardened structure and test specimen in accordance with ASTM C42 when laboratory tests of specimen cylinders show compressive strengths below specified minimum.
 5. Test for air entrainment as specified in design mix in accordance with ASTM C173.
- B. Owner Representative will provide the following inspections:
 1. Review mix designs, certificates of compliance, and samples of materials proposed for use.
 2. Verify hot weather concrete placement in accordance with ACI 305R.
 3. Verify cold weather concrete placement in accordance with ACI 306R.
 4. Concrete placement, sampling, and testing procedures.
 5. Inspect concrete surfaces upon removal of formwork to determine acceptance of concrete surfaces and any required repair or replacement.
- C. The Contractor shall submit ticket for each batch of concrete delivered to jobsite. Ticket shall bear following information:

1. Design Mix Number.
2. Time of batching.
3. Weight of cement, aggregates, water, and admixtures with maximum aggregate size.
4. Total volume of concrete.

3.6 TUNNEL-FORMED CAST-IN-PLACE CONCRETE

- A. In addition to the requirements of this Section, testing and inspection as shall be provided in accordance with requirements listed above for Concrete.
- B. Independent Testing Laboratory shall provide the following testing:
 1. Verification testing for drying shrinkage. Cast four test cylinders for each set.
 - a. Cast test cylinders for each day's production of tunnel-form construction. These cylinders shall be cured by placing in the upper third of the tunnel forms they represent.
 2. Control Cylinders: Cast three control test cylinders for each unit of tunnel-formed construction and cure within the unit the cylinders represent. Do not place cylinders near heaters. Test one cylinder the morning following concrete placing to determine compressive strength gain; if gains in inadequate, test the next two cylinders at 24 hours intervals until adequate strength is attained.
- C. Owner Representative will provide the following inspections:
 1. Inspect concrete surfaces upon removal of tunnel-forms to determine acceptance of concrete surfaces and any required repair or replacement.
 2. Inspect tunnel-forms after each use to ensure structural integrity and dimensional accuracy. Any damage to the form shall be repaired. The replacement of the tunnel form may be required if any damage is designated by the Owner Representative as being not repairable.

3.7 METALLIC CONCRETE TOPPING SLAB

- A. Independent Testing Laboratory shall provide the following testing and inspections:
 1. Iron Aggregate
 - a. Verify manufacturer's quality control and testing methods.
 - b. Verify material has been formulated and processed under stringent quality control, and is free from nonferrous particles, rust, and materials used to disguise rust.
 - c. Verify material consists of specially processed iron aggregate, of optimum gradation, to provide dense wearing surface for maximum toughness, and impact and abrasion resistance.
 2. Testing of Surface Preparation: ICRI Guideline No. 03739.
 - a. Test substrate to determine substrate surface tensile strength after preparation for bonding.
 - b. Perform tests in several locations on each slab scheduled to receive topping.
 - c. Minimum tensile bond pull off strength: Not less than 200 psi; revealing substantial coarse aggregate fracture.
 3. Testing of Vapor Transmission: ASTM F1869.
 4. Perform testing if using epoxy bonding method prior to application of the bonding agent to ensure conditions are suitable to achieve proper bond strength.
- B. Owner Representative will provide the following inspections:
 1. Review mix designs, materials information, and field samples proposed for use.

2. Concrete topping placement, surface preparation, and testing procedures for conformance to manufacturer's recommendations.
3. Concrete topping joint layout for conformance to approved shop drawings.

3.8 TILT-UP AND PRECAST CONCRETE

- A. In addition to the requirements of this Section, testing and inspection as shall be provided in accordance with requirements listed above for Concrete.
- B. Independent Testing Laboratory shall provide the following testing:
 1. Test Modulus of Rupture prior to lifting elements from casting beds.
 - a. Make and cure specimen cylinders according to ASTM C31 for each truckload placed at site as directed by the Owner Representative.
 - b. Use one cylinder for pre-lift test and retain one cylinder for subsequent testing, if necessary.
 - c. Number each cylinder 1A, 1B, 1C, etc.; date each cylinder and keep an accurate record of placement on what panels each cylinder represents.
 - d. Transport specimen cylinders from job to laboratory.
 - e. Test specimen cylinders for Modulus of Rupture at age 7 days or prior to lifting elements from casting beds.
 2. Confirm minimum concrete strength prior to lifting elements from casting beds.

3.9 LIGHTWEIGHT INSULATING CONCRETE

- A. In addition to the requirements of this Section, testing and inspection as shall be provided in accordance with requirements listed above for Concrete.
- B. Independent Testing Laboratory shall provide the following testing:
 1. Test samples obtained in accordance with ASTM C172, except as modified by ASTM C495, as follows:
 - a. Determine as-cast unit weight during each hour of placement, in accordance with ASTM C138.
 - b. Determine oven-dry unit weight and compressive strength according to ASTM C495. Make a set of at least six molds for each day's placement, but not less than one set of molds for each 5,000 sf of roof area.
 - c. Perform additional tests when test results indicate as-cast unit weight, oven-dry unit weight, compressive strength, or other requirements have not been met.
 - d. Retest cast-in-place lightweight insulating concrete according to ASTM C513 for oven-dry unit weight and compressive strength.

3.10 GROUTING

- A. Independent Testing Laboratory shall provide the following testing:
 1. Fine Aggregates.
 - a. Gradation
 - 1) Test in accordance with ASTM C136. 100 percent shall pass No. 8 mesh sieve, no less than 45 percent by weight shall pass No. 4 mesh sieve.
 - 2) Variations from the specified gradations in individual tests will be acceptable if the average of three consecutive tests is within the specified limits and the variation is within the following permissible variations:

U.S. Standard	Permissible Variation in
<u>Sieve Size</u>	<u>Individual Tests, Percent</u>

- | | |
|---------------|-----|
| 30 or Coarser | 2 |
| 50 or Finer | 0.5 |
- 3) Test in accordance with ASTM C117: 3 percent maximum by weight passing No. 200 Sieve.
 - b. Organic Impurities: ASTM C40; color lighter than Standard.
 - c. Soundness: ASTM C88; 10 percent maximum loss with sodium sulfate.
 - d. Reactivity: ASTM C289; Innocuous aggregate.
 - e. Sand Equivalent: CALTEST No. 217; minimum 80.

B. Owner Representative will provide the following inspections:

1. Inspect materials tags and mill certifications.
2. Inspect placement of all reinforcement, plates, and embeds for conformance with Drawings and approved shop drawings to confirm size, spacing, and installation.
3. Verify conformance to manufacturer's written installation instructions.

3.11 CONCRETE PLACED WITHOUT INSPECTION BY OWNER REPRESENTATIVE

- A. Owner Representative will determine the most suitable method of ascertaining quality of concrete.
- B. Contractor shall bear all expenses for x-ray or other inspection of in-place concrete.
- C. Contractor shall bear all expenses for removing concrete determined to be defective.

3.12 RETESTING

- A. When tests or inspections reveal failure of materials to meet the Contract requirements, Independent Laboratory shall provide additional tests in accordance with specified requirements as necessary until acceptance. Retesting shall be performed at no additional expense to the Owner.
- B. The cost of additional inspections by the Owner representative made necessary because of the failure of materials to meet the Contract requirements will be deducted from the Contract Price.

END OF SECTION

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SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Structural and nonstructural wall, floor, and roof framing.
 - 2. Trellis.
 - 3. Blocking, nailers, and shims.
 - 4. Wood furring.
 - 5. Preservative treatment of wood.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 06 16 00 - Sheathing.
 - 3. Section 06 17 53 - Shop-Fabricated Wood Trusses.

1.2 REFERENCES

- A. AITC - American Institute of Timber Construction.
- B. ALSC - Softwood Lumber Standards PS 20.
- C. ANSI/AF&PA NDS - National Design Specification for Wood Construction.
- D. ASTM F1667 - Driven Fasteners: Nails, Spikes, and Staples.
- E. AWWA C1 - Preservative Treatment by Pressure Process.
- F. AWWA C20 - Structural Lumber Fire-Retardant Treatment by Pressure Process.
- G. AWWA UI - User Specification for Treated Wood.
- H. FSC STD-01-001 - Principles and Criteria for Forest Stewardship.
- I. 40 CFR, Part 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).
 - 4. Products
 - a. Wood preservatives.

- b. Proprietary connection devices.

1.4 COORDINATION

- A. Coordinate the design, construction, and installation of rough carpentry with the requirements of the Work of other Sections

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle, stack, and store lumber off the ground in such a manner that it will be protected from damage and prevented from absorbing moisture. Protect with waterproof covering that provides adequate air circulation. Secure covering to prevent blow-off and prevent damage.
- B. Do not store seasoned materials in wet or damp locations.
- C. Protect fire-retardant materials against high humidity and moisture during storage and erection.
- D. Deliver fasteners in bags or boxes, properly tagged for identification.
- E. Store fasteners and attachment devices off the ground in a dry location, protected from dirt, damage, and the elements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Forest Certification: Provide members produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.
- B. Lumber: Douglas Fir; S4S; WCLIB grade marked or by an agency certified by WCLIB; each mill shipment shall be accompanied by a WCLIB certificate of inspection.; size shall be in accordance with PS 20; free of boxed heart; maximum 19 percent moisture content at time of installation; of the following minimum grades.
 - 1. Studs: No. 1 Grade.
 - 2. Structural Joists and Planks (2 to 4 inches thick x 5 inches and wider): No. 1 Grade.
 - 3. Beams and Stringer, Posts and Timbers (5 x 5 inches and larger): Select Structural Grade.
 - 4. Miscellaneous Light Framing (2 to 4 inches thick x 2 to 4 inches wide): Construction Grade.
 - 5. Blocking: No. 2 Grade.
 - 6. Grounds: Straight and free from loose knots and knot holes.
 - 7. Load Carrying Members: Minimum of No. 2 Grade.
- C. Trellis Lumber: Redwood rugged, knot-textured garden grades, all-heartwood grade such as Construction Heart for applications on or near the ground.
- D. Each piece of fire-retardant lumber shall be labeled to show compliance with the UL requirement specified and shall be grade stamped with the applicable AWPA quality mark indicating the preservative and retention.

2.2 FASTENERS

- A. Provide all nails, screws, bolts, washers, lag screws, joist hangers, tie straps, clips, and similar items as required to the complete Work.
- B. Nails: Use types and sizes as indicated, and in accordance with CBC Chapter 23 - Nailing Schedule, except sizes shall not be smaller than indicated.
- C. Powder Actuated Fasteners
 - 1. Types and Sizes: As indicated or appropriate for the Work required and materials involved.
 - 2. Uses: Limited to those indicated, specified, or approved by Owner's Representative.
- D. Anchors
 - 1. Toggle bolt type for anchorage to hollow masonry.
 - 2. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
 - 3. For fastenings secured to hardened concrete or masonry, inserts and sleeves shall be metal only.
 - 4. Bolt or ballistic fastener for anchorages to steel.
- E. Fastener Finishes
 - 1. Fasteners in contact with pressure treated products shall be hot-dipped galvanized.
 - 2. Fasteners exposed to moisture, high humidity, or to the exterior shall be hot-dipped galvanized or cadmium-plated, unless otherwise indicated or specified.
 - 3. Nails and screws shall be corrosion resistant for exterior or damp areas.
 - 4. Finish nails and screws shall be bright finished for other interior Work.
 - 5. Machine bolts and washers shall be corrosion resistant.

2.3 WOOD TREATMENTS

- A. Wood shall be treated with appropriate fire retardant or preservative as necessary in accordance with exposure, wood species, and applicable codes.
- B. VOC Content of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Fire-Retardant Coatings: VOC content for coating category for which coating is formulated.
 - 2. Wood Preservatives: 350 g/L.
 - 3. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 - 4. Non-Flat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 - 5. Floor Coatings: VOC not more than 100 g/L.
 - 6. Shellacs, Clear: VOC not more than 730 g/L.
 - 7. Shellacs, Pigmented: VOC not more than 550 g/L.
 - 8. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
 - 9. Clear Wood Finishes, Varnishes: VOC content of not more than 350 g/L.
 - 10. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
 - 11. Stains: VOC not more than 250 g/L.
- C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following chemical restrictions:
 - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.

- D. Where used for exposed locations, treatment materials shall be types guaranteed to not adversely affect durability and appearance of applied finishes.

- E. Treatment materials having a highly persistent, noticeable residual odor will not be permitted.

- F. After treatment, kiln or air dry lumber and plywood to a moisture content of 19 percent or less.

- G. Pressure Treatment
 1. Items requiring pressure treatment
 - a. Wood used in conjunction with roofing, flashing, vapor barriers, and waterproofing.
 - b. Wood in contact with masonry or concrete.
 - c. Wood subject to insect attack.
 - d. Wood in contact with ground or water.
 - e. Additional locations required by codes, the Owner, or accepted standard construction practice.
 2. Pressure treat items after fabrication where possible. Use surface applied treatment for items cut after pressure treatment.
 3. Do not mill or trim pressure treated items beyond limits recommended by treatment manufacturer.
 4. Surface-Applied Wood Preservative (Type A)
 - a. Nonaqueous solution containing not less than 5 percent pentachlorophenol, commercially prepared and formulated to repel water and inhibit decay.
 - b. Suitable for application by either brush or dip methods.

- c. Integral coloring to allow visual inspection of treated members.
- 5. Pressure-Treated Wood Preservative (Type B)
 - a. Required for lumber and plywood where indicated or specified and not otherwise required to be fire-retardant pressure treated (Type C).
 - b. Provide for lumber and plywood in contact with concrete, masonry, or grout.
 - c. Concealed Locations: Any process acceptable in accordance with AWWPA Standard C1 and meeting specified requirements.
 - d. Exposed Locations: Treated members shall be milled smooth within limits permitted by process manufacturer.
- H. Fire-retardant Treatment
 - 1. Items requiring Fire-retardant treatment
 - a. Wood used in Type I and II buildings.
 - b. Exposed wood.
 - c. Wood used in fire-rated assemblies.
 - d. Wood requiring reduced flame/fuel/smoke ratings.
 - e. Communications Backboards.
 - f. Electrical mounting boards.
 - g. Additional locations required by codes, the Owner, or accepted standard construction practice.
 - 2. Fire-Retardant Pressure Treatment(Type C)
 - a. Processes shall meet requirements of CBC Part 2, Section 207, definition entitled "Fire-Retardant-Treated Wood," and requirements specified herein.
 - b. UL listed and labeled in accordance with UL BMD Section "Lumber, Treated (BPVV)."
 - c. Treated lumber shall be UL classified FR-S.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready for installation of rough carpentry. Notify the Owner's Representative, in writing, of any conditions requiring corrective action.
- B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 NAILING

- A. Predrill undersize holes as necessary to prevent splitting.
- B. Drive nails straight and free from bends.
- C. At multiple or grouped nailing, set alternate nails at slightly different angles to improve strength.
- D. For trim or similar members, side-stagger alternate nails to prevent warp and twist.
- E. Where concealed, set nail heads flush to avoid interference with installation of materials to be applied next.

- F. Where exposed, set nail heads recessed for proper putty stopping.

3.3 FRAMING

- A. Construct and secure rough carpentry as indicated.
- B. Construction details, connections, and fastenings not otherwise indicated shall be in accordance with the requirements of CBC.
- C. Provide solid backing and blocking as indicated and required.
- D. Set members level and plumb, in correct position.
- E. Place horizontal members with crown side up.
- F. Cut and prepare ends and surfaces to effect full bearing, and as otherwise necessary for proper fit.
- G. Cut notches without overcutting inside corners.
- H. Plates and sills on concrete or masonry: Bed plates and sills of exterior walls in Portland cement mortar to obtain continuous level bearing; bolt down after mortar sets. Bed plates for interior partitions when indicated or necessary for level bearing.
- I. Studs: Space as indicated; frame corners with not less than three studs. Set on single sole plate, cap with double top plate lapped at corners, lapped no less than 4 feet at splices.
- J. Posts, Girders, and Beams: Frame to true end bearings; provide supports and anchors of such design to hold securely in position and prevent base deterioration. Splice girders and beams only over bearings.
- K. Curb Members
 - 1. Curb roof openings, except where prefabricated curbs are provided.
 - 2. Construct curb members of single pieces.
 - 3. Form corners by alternating lapping side members.
 - 4. Coordinate curb installation with other Sections whose Work affects or is affected by the Work of this Section.

3.4 BACKBOARDS

- A. Install telephone and electrical panel backboards.
- B. Size backboards as indicated; where not indicated, over-size the backboards by 12 inches on all sides.
- C. Sand to leave paintable surface.

3.5 FIELD-APPLIED WOOD TREATMENT

- A. Surface Applied Preservative (Type A)
 - 1. Treat members after cutting, shaping, and bolting.
 - 2. Application
 - a. Apply in accordance with manufacturer's instructions.

- b. Dip members for 15 minutes, or saturate by brushing on two complete coats at 10 minute intervals.
 - c. Air-dry two hours before setting treated members into place.
- B. Fire-Retardant Pressure Treatment(Type C)
- 1. After cutting, shaping, and boring, retreat surfaces using materials and methods in accordance with manufacturer's instructions.

3.6 TESTING AND INSPECTION

- A. Testing and inspection shall be in accordance with CBC Section 1704A.6.
- B. OWNER Representative will provide the following inspections:
- 1. Inspect wood structural elements and assemblies to ensure conformance with the Contract Documents.
 - 2. Inspect timber connectors to ensure conformance with the Contract Documents.

3.7 DEFECTIVE WORK

- A. When complete, rough carpentry shall be free from unnecessary cuts, holes, and other damage and defects.
- B. Rough carpentry not conforming to required lines, details, dimensions, tolerances, finishes, strength, or other specified requirements shall be considered defective. Notify the Owner's Representative upon discovery of these conditions.
- C. Required repair or replacement of defective rough carpentry will be determined by the Owner's Representative.
- D. Do not patch, fill, touch-up, repair, or replace rough carpentry except upon express direction of Owner's Representative for each individual area.
- E. Defective rough carpentry shall be repaired or replaced as recommended by the Owner's Representative at no additional expense to the Owner.

3.8 PROTECTION

- A. Protect rough carpentry from damage from subsequent construction operations.

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SECTION 06 16 00

SHEATHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Wall and roof sheathing.
 - 2. Telephone and electrical panel boards.
 - 3. Preservative treatment of wood.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 06 20 00 - Finished Carpentry.
 - 3. Section 27 32 00 - Telephone Raceway System.

1.2 REFERENCES

- A. ANSI/AF&PA NDS - National Design Specification for Wood Construction.
- B. ASTM C557 - Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- C. ASTM D3498 - Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- D. ASTM F1667 - Driven Fasteners: Nails, Spikes, and Staples.
- E. AWWA C9 - Plywood Preservative Treatment by Pressure Process.
- F. AWWA C27 - Plywood Structural Lumber Fire-Retardant Treatment by Pressure Process.
- G. AWWA UI - User Specification for Treated Wood.
- H. DOC PS-1 - US Product Standard for Construction and Industrial Plywood.
- I. FSC STD-01-001 - Principles and Criteria for Forest Stewardship.
- J. 40 CFR, Part 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).
 - 4. Products
 - a. Wood preservatives.

- b. Proprietary connection devices.

1.4 COORDINATION

- A. Coordinate the design, construction, and installation of sheathing with the requirements of the Work of other Sections

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle, stack, and store sheathing off the ground in such a manner that it will be protected from damage and prevented from absorbing moisture. Protect with waterproof covering that provides adequate air circulation. Secure covering to prevent blow-off and prevent damage.
- B. Do not store seasoned materials in wet or damp locations.
- C. Protect fire-retardant materials against high humidity and moisture during storage and erection.
- D. Protect sheathing against damage to edge, corner, and surfaces while unloading handling.
- E. Store sheathing in an enclosed area or protect as specified for lumber.
- F. Deliver fasteners in bags or boxes, properly tagged for identification.
- G. Store attachment devices off the ground in a dry location, protected from dirt, damage, and the elements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Forest Certification: Provide sheathing produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.
- B. Plywood: Softwood plywood; DOC PS-1; grade stamped in accordance with APA Guide to Plywood Grades or other approved testing agency, and with the requirements of PS 1; 4 x 8-foot panel size unless otherwise indicated.
 - 1. Concealed Sheathing: C/D - INT with exterior glue.
 - 2. Concealed Structural Components: Structural I C/D - INT with exterior glue.
 - 3. Telephone and Electric Terminal Boards: B/D - INT; 3/4 inch thick, square edges; fire-retardant pressure treated.
- C. Each piece of fire-retardant sheathing shall be labeled to show compliance with the UL requirement specified and shall be grade stamped with the applicable AWPA quality mark indicating the preservative and retention.

2.2 FASTENERS

- A. Furnish all nails, screws, bolts, washers, lag screws, tie straps, clips, and similar items as required to complete Work.

- B. Nails: Use types and sizes as indicated, and in accordance with CBC Chapter 23 - Nailing Schedule, except sizes shall not be smaller than indicated.
- C. Powder-Actuated Fasteners
 - 1. Types and Sizes: As indicated or appropriate for the Work required and materials involved.
 - 2. Uses: Limited to those indicated, specified, or approved by the Owner's Representative.
- D. Anchors
 - 1. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
 - 2. For fastenings secured to hardened concrete or masonry, inserts and sleeves shall be metal only.
- E. Fastener Finishes
 - 1. Fasteners in contact with pressure treated products shall be hot-dipped galvanized.
 - 2. Fasteners exposed to moisture, high humidity or to the exterior shall be hot-dipped galvanized or cadmium-plated, unless otherwise indicated or specified.
 - 3. Nails and screws shall be corrosion resistant for exterior or damp areas.
 - 4. Finish nails and screws shall be bright finished for other interior Work.
 - 5. Machine bolts and washers shall be corrosion resistant.
- F. Adhesives: ASTM C557.
 - 1. Epoxy for structural bonding rough carpentry.
 - 2. Manufacturers
 - a. BASF Construction Chemicals; "Sonneborn 400".
 - b. OSI Pro-Series; SF-565 VOC Compliant Sub-Floor Adhesive.
 - c. Approved Equal.

2.3 WOOD TREATMENTS

- A. Wood shall be treated with appropriate fire retardant or preservative as necessary in accordance with exposure, wood species, and applicable codes.
- B. VOC Content of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Fire-Retardant Coatings: VOC content for coating category for which coating is formulated.
 - 2. Wood Preservatives: 350 g/L.
 - 3. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 - 4. Non-Flat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 - 5. Floor Coatings: VOC not more than 100 g/L.
 - 6. Shellacs, Clear: VOC not more than 730 g/L.
 - 7. Shellacs, Pigmented: VOC not more than 550 g/L.
 - 8. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
 - 9. Clear Wood Finishes, Varnishes: VOC content of not more than 350 g/L.
 - 10. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.5.
 - 11. Stains: VOC not more than 250 g/L.
- C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following chemical restrictions:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
- D. Where used for exposed locations, treatment materials shall be types guaranteed to not adversely affect durability and appearance of applied finishes.
- E. Treatment materials having a highly persistent, noticeable residual odor will not be permitted.
- F. After treatment, kiln or air dry lumber and plywood to a moisture content of 19 percent or less.
- G. Pressure Treatment: AWWPA C9.
1. Items requiring pressure treatment
 - a. Wood used in conjunction with roofing, flashing, vapor barriers, and waterproofing.
 - b. Wood in contact with masonry or concrete.
 - c. Wood subject to insect attack.
 - d. Wood in contact with ground or water.
 - e. Additional locations required by codes, the Owner, or accepted standard construction practice.
 2. Pressure treat items after fabrication where possible. Use surface applied treatment for items cut after pressure treatment.
 3. Do not mill or trim pressure treated items beyond limits recommended by treatment manufacturer.
 4. Surface-Applied Wood Preservative (Type A)

- a. Nonaqueous solution containing not less than 5 percent pentachlorophenol, commercially prepared and formulated to repel water and inhibit decay.
- b. Suitable for application by either brush or dip methods.
- c. Integral coloring to allow visual inspection of treated members.
- 5. Pressure-Treated Wood Preservative (Type B)
 - a. Required for sheathing where indicated or specified and not otherwise required to be fire-retardant pressure treated (Type C).
 - b. Provide for sheathing in contact with concrete, masonry, or grout.
 - c. Concealed Locations: Any process acceptable in accordance with AWPA Standard C1 and meeting specified requirements.
 - d. Exposed Locations: Treated sheathing shall be milled smooth within limits permitted by process manufacturer.
- H. Fire-retardant Treatment: AWPA C27.
 - 1. Items requiring Fire-retardant treatment
 - a. Sheathing used in Type I and II buildings.
 - b. Exposed sheathing.
 - c. Sheathing used in fire-rated assemblies.
 - d. Sheathing requiring reduced flame/fuel/smoke ratings.
 - e. Communications Backboards.
 - f. Electrical mounting boards.
 - g. Additional locations required by codes, the Owner, or accepted standard construction practice.
 - 2. Fire-Retardant Pressure Treatment (Type C)
 - a. Treated sheathing shall be listed and labeled in accordance with UL BMD Section "Treated Plywood (BUGV)."
 - 3. Treated sheathing shall be UL Classified FR-S or shall have equivalent flame-spread and smoke-developed values.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready for installation of sheathing. Notify the Owner's Representative, in writing, of any conditions requiring corrective action.
- B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.
- C. Drive nails straight and free from bends.

3.2 INSTALLATION

- A. Construct and secure sheathing as indicated.
- B. Make provision for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Construction details, connections, and fastenings not otherwise indicated shall be in accordance with the requirements of CBC.

- D. Drive nails straight and free from bends. Do not overdrive.
- E. Provide solid backing and blocking as indicated and required.
- F. Cut notches without overcutting inside corners.
- G. Install sheathing perpendicular to framing members, with ends staggered, over firm bearing.
- H. Allow expansion space at edges and ends.
- I. Use sheathing clips at unsupported edges of sheathing between supporting framing members.

3.3 BACKBOARDS

- A. Install telephone and electrical panel backboards.
- B. Size backboards as indicated; where not indicated, over-size the backboards by 12 inches on all sides.
- C. Sand to leave paintable surface.

3.4 FIELD-APPLIED WOOD TREATMENT

- A. Surface Applied Preservative (Type A)
 - 1. Treat members after cutting, shaping, and bolting.
 - 2. Application
 - a. Apply in accordance with manufacturer's instructions.
 - b. Dip members for 15 minutes, or saturate by brushing on two complete coats at 10 minute intervals.
 - c. Air-dry two hours before setting treated members into place.
- B. Fire-Retardant Pressure Treatment (Type C)
 - 1. After cutting, shaping, and boring, retreat surfaces using materials and methods in accordance with manufacturer's instructions.

3.5 TOLERANCES

- A. Surface Flatness of Sheathing Without Load: 1/4 inch in 10 feet maximum, and 1/2 inch maximum in 30 feet.

3.6 TESTING AND INSPECTION

- A. Testing and inspection shall be in accordance with CBC Section 1704A.6.
- B. Owner Representative will provide the following inspections:
 - 1. Inspect sheathing and assemblies to ensure conformance with the Drawings and Specifications.
 - 2. Inspect sheathing connectors to ensure conformance with the Drawings and Specifications.

3.7 DEFECTIVE WORK

- A. When complete, sheathing shall be free from unnecessary cuts, holes, and other damage and defects.
 - B. Sheathing not conforming to required lines, details, dimensions, tolerances, finishes, strength, or other specified requirements shall be considered defective. Notify the Owner's Representative upon discovery of these conditions.
 - C. Required repair or replacement of defective sheathing will be determined by the Owner's Representative.
 - D. Do not patch, fill, touch-up, repair, or replace sheathing except upon express direction of the Owner's Representative for each individual area.
 - E. Defective sheathing shall be repaired or replaced as recommended by the Owner's Representative at no additional expense to the Owner.
- 3.8 PROTECTION
- A. Protect sheathing from damage from subsequent construction operations.

END OF SECTION

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SECTION 061753

SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Shop fabricated wood trusses for roof framing.
 - 2. Bridging, bracing, and anchorage.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 06 10 00 - Rough Carpentry.

1.2 REFERENCES

- A. ALSC: Softwood Lumber Standards.
- B. ASTM A167 - Stainless and Heat Resisting Chromium - Nickel Steel Plate, Sheet, and Strip.
- C. ASTM A653 - Steel Sheet, Zinc Coated (Galvanized), or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM A924 - Steel Sheet, Metallic-Coated by the Hot-Dip Process, General Requirements.
- E. AWPA C1 - All Timber Products Preservative Treatment by Pressure Process.
- F. AWPA C20 - Structural Lumber Fire-Retardant Treatment by Pressure Process.
- G. FSC STD-01-001 - Principles and Criteria for Forest Stewardship.
- H. TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction.
- I. TPI BWT - Bracing Wood Trusses.
- J. TPI HET - Handling and Erecting Wood Trusses.
- K. TPI PCT - Metal Plate Connected Parallel Chord Wood Trusses.
- L. TPI QST - Quality Standard for Metal Plate Connected Wood Trusses.
- M. ANSI/AF&PA NDS - National Design Specifications for Wood Construction.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 and 01 33 23.
- B. Shop Drawings
 - 1. Indicate truss spacing, cambers, framed openings, field connection details for truss subassemblies, and erection plans.

2. Indicate truss elevations showing geometry, member sizes and centerline intersections, plate sizes and locations, and locations and widths of supports.
 3. Indicate truss design loads.
 4. Indicate wood species and grades.
 5. Indicate steel plate grade, type, gage, and dimensions.
 6. Indicate other information required for fabrications and erection.
 7. Shop drawings to be stamped and signed by a Professional Civil Engineer registered in the State of California.
- C. Design Calculations
1. Indicate axial forces, determined assuming member ends to be pinned at joints.
 2. Indicate loads.
 - a. Uniform distributed loads on top and bottom chord.
 - b. Piping loads.
 - c. Mechanical equipment loads, using operating weight of selected equipment.
 3. Indicate analysis of metal plate connectors.
 - a. Show lateral load per tooth or per square inch of plate.
 - b. Show effective area of plate.
 - c. Show stresses in steel at critical net sections of plates.
 - d. Calculations to be stamped and signed by a Professional Civil Engineer registered in the State of California.
- D. Product Data
1. Include data covering lumber, metal plates, hardware, fabrication process, handling, erection, and copy of ICC ESR approval for connector plates.
 2. Manufacturer's installation instructions.
- E. Certificates
1. Certificate signed by officer of fabricating firm that products comply with specified requirements.
- F. Qualification Data
1. For manufacturer.
- G. Delivery Schedules
- 1.4 DESIGN REQUIREMENTS
- A. Design shall be performed under the direct supervision of and sealed by a Professional Structural Engineer licensed in the State of California and experienced in the design of this Work.
- B. Design roof live load: 20 psf.
- C. Truss Design
1. Design trusses to resist axial forces, assuming member ends to be pinned at joints.
 2. Assume uniform distributed loads on top and bottom chords are concentrated at panel points, but their effects are to be taken into consideration in top and bottom chord design.
- D. Plate Connector Design

1. Determine effective area of plates and allowable load per tooth or per square inch in accordance with TPI 1.
 2. No increase for load duration or metal side plates is permitted.
- 1.5 QUALITY ASSURANCE
- A. Truss Design, Fabrication, and Installation: In accordance with TPI 1, BWT, HET, PCT and QST including supplements.
 - B. Maintain one copy of document on site.
- 1.6 QUALIFICATIONS
- A. Manufacturer: Company specializing in manufacturing the wood trusses specified in this Section with minimum three years experience.
- 1.7 COORDINATION
- A. Coordinate the design, construction, and installation of wood trusses with the requirements of the Work of other Sections.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Time delivery to avoid extended on-site storage.
 - B. Handle and erect trusses in accordance with TPI HET.
 - C. Store trusses in vertical position resting on bearing ends. Brace to prevent bending, twisting, and tipping.
 - D. Store trusses on level supports above the ground, separated by wood strips to permit air circulation around each unit. Cover and protect from exposure to weather.
 - E. Deliver fasteners in bags or boxes, properly tagged for identification.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Lumber
 1. Species: Douglas Fir, No. 2 and better graded by WWPA or WCLIB.
 2. Stress Grades: Conform to the grades indicated in the calculations submitted.
 3. Moisture Content: Maximum 19 percent; minimum 7 percent.
 4. Finger Scarfing: Not permitted.
- B. Steel Connectors: ASTM A653 steel, Grade A, Coating G60.

2.2 ACCESSORIES

- A. Miscellaneous Lumber: Specified in Section 06 10 00.
- B. Fasteners: Electro-galvanized steel, type to suit application.

2.3 FABRICATION

- A. Fabricate trusses to achieve structural requirements specified and in accordance with the approved shop drawings.
- B. Cut truss members accurately to length and angle, and true to line to provide tight joints.
- C. Provide steel connectors on both faces of trusses at every joint. Identify connector plates by type, grade, gage, and manufacturer.
- D. Wood under plates shall be free of knots, knot holes, and greatly distorted grains.
- E. Place truss members and connector plates in jigs and tightly clamp the members in place until the connector plates have been pressed into the lumber simultaneously on both sides of the joints. Apply one 8 penny short ring-shank nail to each member at each plate.
- F. Camber trusses for one and one-half times the dead load deflection.
- G. Identification
 - 1. Stamp each truss with the name and address of the licensed prefabricated truss fabricator.
 - 2. Suitably mark each member to identify final location in Work as indicated on approved shop drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the trusses. Notify the County's Representative, in writing, of any conditions requiring corrective action.
- B. Verify that field measurements are as indicated on approved shop drawings.
- C. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 ERECTION

- A. Install trusses in accordance with manufacturer's instructions, the approved shop drawings, and recommendations of the Truss Plate Institute.
- B. Set members level and plumb, in correct position.
- C. Nail double trusses together for full load sharing in accordance with the approved shop drawings and manufacturer's instructions.
- D. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.
- E. Provide chord ties as indicated; install as erection proceeds.

- F. Provide temporary bracing to maintain alignment and prevent lateral movement until sheathing is completely nailed to the trusses and edge blocking.
- G. Place headers and supports to frame openings required.
- H. Frame openings between trusses with lumber in accordance with Section 06 10 00.
- I. Coordinate placement of sheathing with the Work of this Section.
- J. Do not allow copper piping to come into contact with wood trusses treated with ammonium sulfate fire retardant. Coordinate with requirements of Division 22 and 23.
- K. Do not allow trusses to be structurally overloaded.

3.3 TOLERANCES

- A. Framing Members: 1/2 inch maximum, from true position.

3.4 FIELD INSPECTION

- A. Inspection will be in accordance with CBC Section

3.5 REPAIR AND ADJUSTMENT

- A. After erection, touch-up galvanized surfaces with zinc primer.
- B. Do not field cut, drill, or otherwise alter trusses without approval of the County's Representative

3.6 DEFECTIVE WORK

- A. Trusses not conforming to required lines, details, dimensions, tolerances, finishes, strength, or other specified requirements shall be considered defective. Notify the County's Representative upon discovery of these conditions.
- B. Required repair or replacement of defective trusses will be determined by the County's Representative.
- C. Do not patch, fill, touch-up, repair, or replace trusses except upon express direction of the County's Representative for each individual area.
- D. Defective trusses shall be repaired or replaced as recommended by the County's Representative at no additional expense to the County.

3.7 PROTECTION

- A. Protect trusses from damage from subsequent construction operations.

B. Provide protection in accordance with manufacturer's instructions.

END OF SECTION

SECTION 062000
FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Finish carpentry items, other than shop prefabricated casework.
 - 2. Wood treatment.
 - 3. Hardware and attachment accessories.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements.
 - 2. Section 06 10 00 - Rough Carpentry.
 - 3. Section 06 16 00 - Sheathing.
 - 4. Section 06 41 16 - Plastic-Laminate-Clad Architectural Cabinets.
 - 5. Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

- A. ANSI A208.1 - Particleboard.
- B. ASTM D3498 - Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- C. DOC PS 1 - US Product Standard for Construction and Industrial Plywood.
- D. FSC STD-01-001 - Principles and Criteria for Forest Stewardship.
- E. WI - Woodwork Institute, Manual of Millwork.
- F. 40 CFR, Part 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).
- C. Certificates
 - 1. Identification: In lieu of stamping for grade and fire retardant rating on exposed-to-view lumber and plywood, submit manufacturer's certificate that products meet or exceed the specified requirements.

1.4 REGULATORY REQUIREMENTS

- A. Materials and fabrication of finish carpentry work shall be in accordance with the standards of the Woodwork Institute (WI) "Manual of Millwork" for Custom Grade unless otherwise indicated.
- B. Redwood Quality and Treatment: California Redwood Association, (CRA) San Francisco, and Redwood Inspection Service (RIS).
- C. Fire Retardant Treatment: CBC Section 720.1
 - 1. Conform to applicable code requirements for fire retardant treatment.

1.5 COORDINATION

- A. Coordinate the design, construction, and installation of finished carpentry with the requirements of the Work of other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products suitably wrapped or packaged to protect against damage. Do not remove protective coverings until time of installation.
- B. Store materials in interior ventilated locations, under constant minimum temperature of 60 degrees F and maximum relative humidity of 55 percent.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

- A. Forest Certification: Provide sheathing produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.

2.2 MATERIALS - INTERIOR FINISHED CARPENTRY

- A. Particleboard: ANSI A208.1, Grade M-2 made with binder containing no urea-formaldehyde resin.
- B. Plywood: Douglas Fir; DOC PS-1; A/C - INT with exterior glue; grade stamped by APA on other approved testing agency; 4 x 10-foot panels where used as interior wall finish, 4 x 8-foot panels elsewhere.
- C. Trim
 - 1. Douglas Fir, Custom Grade for opaque finish, in accordance with WI, Section 3 for boards, worked products and dimension lumber.
 - 2. Fabricate for opaque finish in accordance with WI, Section 10, 11 and 12, Custom Grade.
- D. Wood Shelving
 - 1. Softwood lumber or plywood, Custom Grade, for opaque finish; species in accordance with WI Sections 3 and 5.
 - 2. Fabricate in accordance with WI Section 11, Custom Grade.

3. Plywood Edge Banding: Matching softwood on exposed edges.
- E. Clothes Poles
1. Poles: Douglas Fir, Custom Grade, in accordance with WIC, Section 3; 1-1/4-inch diameter.
 2. Hardware: End brackets and intermediate supports in accordance with WI, Section 11, Custom Grade.
- F. Other materials shall be in conformance with applicable portions of the referenced WI manual, Custom Grade.

2.3 MATERIALS - EXTERIOR FINISH CARPENTRY

- A. Wood Trim:

2.4 ACCESSORIES

- A. Glue

1. Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
2. VOC Content: Not more than 30 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Multipurpose Construction Adhesive

1. Formulation complying with ASTM D3498 that is recommended for indicated use by adhesive manufacturer.
2. VOC Content: Not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 FIRE RETARDANT TREATMENT

- A. Manufacturers

1. Arch Wood Protection, Inc.; Dricon FRT Wood.
2. J. H. Baxter & Co.; D-Blaze
3. Hoover Treated Wood Products, Inc.; Pyro-Guard.

- B. Fire Retardant: "FRS" Rating Under UL Classification; chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25.

- C. Provide fire retardant treatment for interior wood materials.

1. Size before treatment to minimize cutting after treatment.
2. Provide UL approved identification on fire retardant treated material.
3. Brush coat surfaces cut after treatment using same formulation as impregnated at plant, in accordance with manufacturer's instructions.

- D. Moisture Content: After treatment, re-dry wood to moisture content specified for wood prior to treatment.

- E. VOC Content of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Fire-Retardant Coatings: VOC content for coating category for which coating is formulated.
 2. Wood Preservatives: 350 g/L.
 3. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 4. Non-Flat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 5. Floor Coatings: VOC not more than 100 g/L.
 6. Shellacs, Clear: VOC not more than 730 g/L.
 7. Shellacs, Pigmented: VOC not more than 550 g/L.
 8. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
 9. Clear Wood Finishes, Varnishes: VOC content of not more than 350 g/L.
 10. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
 11. Stains: VOC not more than 250 g/L.
- F. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following chemical restrictions:
1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.

2.6 FABRICATION

- A. Fabricate products in accordance with WI Custom Grade requirements, and the referenced Sections of the WI Manual.
- B. Insofar as possible, cuts required to accommodate the Work of other Sections shall be made in the shop.
- C. Shop fabricate products in whole units or in partial units as most practical for handling and transportation. Assemble partial units in place so that each complete unit becomes a unified whole visually and structurally.
- D. Fabricate fillers and scribe strips of same materials and finishes as units with which they are associated.
- E. Make cuts for hardware neat and true.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the Owner's Representative, in writing, of any conditions requiring corrective action.
- B. Verify mechanical, electrical, and building items affecting the Work of this Section are placed and ready to receive this Work.
- C. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Remove products from their protective wrappings as near the area of installation as possible.
- B. Before installation, back-prime wood.
- C. Before installation, prime paint surfaces of items and assemblies to be in contact with cementitious materials.
- D. When specifically approved by Owner's Representative, items and assemblies may be painted under provisions of Section 09 90 00 prior to installation.

3.3 INSTALLATION

- A. Install finish carpentry in accordance with referenced standards and the manufacturer's printed instructions.
- B. Set Work straight, plumb, level, and true to line indicated, with tight joints between sections or units; scribe to wall and other surfaces as required.

- C. Where plywood is secured directly to framing members, apply with ends over firm bearing and staggered.
- D. Set trim in place in full lengths, without piecing. Where use of single lengths is not possible, bevel butt joints. Unless otherwise indicated, miter joints at exterior angles; cope interior angles of molded parts.
- E. Hardware Installation: Install auxiliary items after final finishing has been completed. Fit securely. Recess screw heads for covering.
- F. Provide anchoring and fastening devices required for installation, including wood and sheet metal screws, bolts, toggle bolts, lag screws and expansion shields, and similar items; fastenings shall be electroplated.
- G. Set nails and screws and completely fill or putty nail and screw holes; leave smooth and flush with adjacent surfaces.

3.4 DEFECTIVE WORK

- A. Finish carpentry not conforming to required lines, details, dimensions, tolerances, finishes, or other specified requirements shall be considered defective. Materials damaged beyond repair or stained beyond cleaning shall be considered defective. Notify the Owner's Representative upon discovery of these conditions.
- B. Required repair or replacement of defective finish carpentry will be determined by the Owner's Representative.
- C. Defective finished carpentry shall be repaired or replaced as recommended by the Owner's Representative at no additional expense to the Owner.

3.5 PROTECTION

- A. Protect plastic laminate covered casework from damage from subsequent construction operations until Acceptance.

END OF SECTION

SECTION 064116

PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Fabricated cabinet units.
 - 2. Countertops.
 - 3. Cabinet hardware.
 - 4. Prefinished surfaces.
 - 5. Wall splash guards.
 - 6. Preparation for installing utilities.
 - 7. Plastic laminate covered wood gates.

- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 06 10 00 - Rough Carpentry.
 - 3. Section 06 20 00 - Finish Carpentry.
 - 4. Section 09 90 00 - Painting and Coatings.

1.2 REFERENCES

- A. AHA 135.4 - Basic Hardboard.
- B. ANSI 208.1 - Particleboard.
- C. ANSI 208.2 - Medium Density Fiberboard (MDF) for Interior Applications.
- D. FS-MMM-A-130 - Adhesive, Contact.
- E. NEMA LD3 - High Pressure Decorative Laminates.
- F. WI - Woodwork Institute - Manual of Millwork.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 and 01 33 23.

- B. Shop Drawings
 - 1. Indicate the cabinet Work in full detail.
 - 2. Show materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware, hardware location, and schedule of finishes.
 - 3. Bear WI Certified Compliance Grade Stamp indicating grade specified.

- C. Product Data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and installation/application instructions.
 - 3. Material Safety Data Sheets (MSDS).
 - 4. Credit IEQc4.1; for installation adhesives, including printed statement of VOC content.
 - 5. Credit IEQc4.4; for each composite-wood product used, documentation indicating that the bonding agent contains no urea formaldehyde.
 - 6. Credits MRc4; for products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content, the manufacturer, and the source of the recycled content data.
 - 7. Credit MRc7; Chain-of-custody (COC) certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that vendor that invoices FSC-certified wood products to project contractors and sub-contractors is certified for chain of custody by an FSC-accredited certification body. Include copy of vendor invoice identifying all wood products and all FSC products on a line-item basis, the value of each line item, and the vendor's COC number.
- D. Samples: Complete range of manufacturer's standard, solid, plastic laminate colors and textures for selection of color/texture combinations.
- E. Certification: Prior to delivery to the jobsite, furnish a WI Certified Compliance Certificate certifying that products to be furnished for this project will meet the requirements of the grade specified.

1.4 DESIGN REQUIREMENTS

- A. Verify field measurements prior to preparing shop drawings.
- B. All products and construction shall be in accordance with WI Manual of Millwork.
- C. Product requirements
 - 1. Plastic Laminate Covered Casework: Custom Grade; frameless construction; flush overlay doors and drawers unless otherwise indicated.
 - 2. Laminated Plastic Countertops, Splashes, and Wall Paneling: Custom Grade.
 - 3. Laboratory Tops, Splashes, and Reagent Shelves: Custom Grade.

1.5 COORDINATION

- A. Coordinate the design, construction, and installation of the Work with the requirements of the Work of other Sections.
- B. Coordinate the Work with plumbing and electrical rough-in.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products suitably wrapped or packaged to protect against damage. Do not remove protective coverings until time of installation.
- B. Store products indoors, in a dry location, out of the way of construction activities.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Wood Products: Comply with the following:
 - 1. Recycled Content of Medium-Density Fiberboard and Particleboard: Provide products with an average recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 50 percent.
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
 - 3. Hardboard: AHA 135.4.
 - 4. Particleboard: ANSI A208.1, Grade M-2.

- B. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
 - 1. General purpose type 0.050 inch thick with Backer type 0.020 inch thick backing sheet for general use.
 - 2. Cabinet-Liner type 0.020 inch thick for interiors of casework.
 - 3. County's Representative will select a maximum of two color/texture combinations from manufacturer's standard range.

- C. Adhesives
 - 1. General: Do not use adhesives that contain urea formaldehyde.
 - 2. VOC Content for Installation Adhesives and Glues: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesive: 250 g/L.

2.2 ACCESSORIES

- A. Finish Hardware
 - 1. Provide finish hardware in conformance with WI Manual of Millwork Sections 1, 2, & 3 to 14 and 15, unless otherwise indicated.
 - 2. Heavy duty wrap-around offset for overlay doors with non-removable pin; dull chrome finish.
 - 3. Door and drawer pulls
 - a. Manufacturers
 - 1) Sugatsune USA; SN Stainless Steel Pulls.]
 - 2) Stanley Tools; No. 4484, US28.
 - 4. Drawer slides: Metal type, as indicated in the WI Manual; full extension with no deflection. 1/2-inch slide space, 100 pound load capacity.
 - 5. Shelf standards: Let-in, extending from top to bottom of cabinets.
 - a. Manufacturers
 - 1) Knappe and Vogt; [No. 255 x 256.
 - 2) Approved equal.
 - 6. Catches
 - a. At Doors with Locks
 - 1) Manufacturers
 - a) Ives; elbow catches or approved equal.
 - 7. Gate Hinges: Double acting, spring loaded.
 - 8. Gate Latch: Snap latch with retractable thumb turn.
 - 9. Cabinet Door and Drawer Locks

- a. Manufacturers
 - 1) Schlage Lock Co., Model 46-002, with slot strike.
 - 2) Approved equal
 - b. Keying
 - 1) Tumbler locks, keyed alike by building.
 - 2) Provide for each key combination, two keys for each lock or a minimum of 10 keys, whichever is greater. Provide 5 blanks.
 - 3) Deliver keys to the County's Representative in clearly marked, sealed envelopes.
- B. Screws
- 1. Straight shank double thread particle board screws or other type best suited for intended application in accordance with referenced standards.
- C. PVC Grommet: As indicated.
- 1. Cove Stick: 1-inch radius; same thickness as core material; no voids at joints, no voids between plastic laminate and cove stick.
 - 2. Other materials shall be in conformance with the applicable referenced standards.

2.3 FABRICATION

- A. Fabricate products in accordance with WI Custom Grade requirements, and the referenced sections of the WI Manual of Millwork. In addition, semi-exposed portions shall be covered with polyester overlay.
- B. Insofar as possible, make in the shop, cuts required to accommodate the Work of other Sections. Verify locations of cut-outs from on-site dimensions. Prime paint or seal contact surfaces of cut edges.
- C. Shop fabricate products in whole units or in partial units as most practical for handling and transportation.
 - 1. Assemble partial units in place in such manner that each complete unit becomes a unified whole visually and structurally.
 - 2. Fabricate fillers and scribe strips of same materials and finishes as units with which they are associated.
 - 3. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
 - 4. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 5. Cap exposed plastic laminate edges with material of same finish and pattern.
- D. Counter Tops and Splashes
 - 1. Plastic laminate covered, meeting Custom Grade requirements of WI, Section 16; exposed ends self-edged.
 - 2. Fabricate countertop surfaces pressure glued to plywood or particle core backing without visible joints.
 - 3. Counter top with Sinks: Fully formed; self edge at cutouts for under-counter mounted sinks.
 - 4. Counter Tops without sinks: Cove backsplash, square butt end splash, rolled edge.
- E. Drawer Boxes

1. Provide with subfronts and applied finish fronts securely fastened, with square corners.
 2. Provide plastic laminate covered casework with shelf edges drawer fronts.
 3. Provide drawers with metal slides as specified.
 4. Provide each drawer with key lock as specified.
- F. Doors
1. Flush overlay type, hinged to swing flat against the face of adjoining cabinet or the side of cabinet, with square corners.
 2. Provide plastic laminate covered casework with self-edged doors.
 3. Do not notch door or cabinet ends, or divisions to receive hinge.
 4. Provide each door with key lock as specified.
- G. Shelves
1. 3/4-inch thick for spans up to 35 inches and 1-inch thick for spans over 35 inches up to 48 inches, and adjustable to 1 inch on center.
 2. Recess metal shelf standards into the end panels.
- H. Plastic Laminate Covered Casework: Cabinet liner finish on cabinet interiors, including faces and edges of shelving therein, and interior door faces.
- I. Wall Mounted Shelving: Fabricate shelving with plastic laminate finish in accordance with Custom Grade requirements of WI Section 15.
- J. Provide matching plastic laminate panels above wall cabinets; align face of panels with face of wall cabinet door, or edge of cabinets without doors.
- K. Make cuts for hardware neat and true. Install hardware and fit securely.
- 2.4 FACTORY FINISHING
- A. Prime paint and seal surfaces in contact with metallic or cementitious materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the County's Representative, in writing, of any conditions requiring corrective action.
- B. Verify adequacy of backing and support framing.
- C. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation indicates acceptance of existing conditions.

3.2 PREPARATION

- A. Remove products from their protective wrappings as near the areas of installation as possible.

3.3 INSTALLATION

- A. Install products rigid, plumb, level, and true; scribe to fit.

- B. Secure units in accordance with CCR Title 24 requirements and in no case less than 16 inches on center for wall hung units and 32 inches on center for base units.
- C. Attach components in concealed locations.
- D. Use threaded steel concealed joint fasteners to align and secure adjoining counter tops casework and telephone enclosure.
- E. Carefully scribe casework which is against other building materials, leaving gaps of 1/32 inch maximum. Do not use additional overlay trim for this purpose.
- F. Install plastic laminate wall splash guards using manufacturer-recommended adhesive. Install in longest lengths possible to minimize joints.

3.4 CLEANING AND ADJUSTING

- A. Following completion of installation, remove dirt and other adhering foreign matter from installed products.
- B. Clean interior and exterior surfaces of casework; clean and polish hardware, all in conformance with manufacturer's recommendations and referenced standards.
- C. Adjust drawers, doors, movable shelves, and other operating parts to operate easily and smoothly without binding or excessive play.

3.5 DEFECTIVE WORK

- A. Casework not conforming to required lines, details, dimensions, tolerances, finishes, or other specified requirements shall be considered defective. Materials damaged beyond repair or stained beyond cleaning shall be considered defective. Notify the County's Representative upon discovery of these conditions.
- B. Required repair or replacement of defective casework will be determined by the County's Representative.
- C. Defective casework shall be repaired or replaced as recommended by the County's Representative at no additional expense to the County.

3.6 PROTECTION

- A. Protect plastic laminate covered casework from damage from subsequent construction operations until Acceptance.

END OF SECTION

SECTION 071400

FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vapor Emission Floor Treatment.
 - 2. Accessory Materials
- B. Related Sections:
 - 1. Section 01 81 00 - Sustainability Requirements
 - 2. Section 03 30 00 - Cast-In-Place Concrete.
 - 3. Section 09 65 00 - Resilient Flooring.

1.2 REFERENCES

- A. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- B. ASTM C1315 - Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- C. DIN 1048-1 - Testing Concrete; Testing of Fresh Concrete.
- D. DIN 1048-2 - Testing Concrete; Testing of Hardened Concrete

1.3 SUBMITTALS

- A. Submit in accordance with Section Division 1.
- B. Product Data:
 - 1. Indicate manufacturer, product, and performance with specified requirements.
 - 2. Provide material safety data sheets in compliance with Federal hazard communication standards.
 - 3. Credit IEQc4.2; for product MSDS, including printed statement of VOC content.
- C. Manufacturer's application instructions.
- D. Manufacturer's certificate indicating applicator is an accepted installer.
- E. Moisture vapor emission test results. Indicate environmental conditions, installation procedures used, deficiencies and corrective actions taken for filler, vapor emission coating, and membrane.
- F. Warranty: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Applicator: Company approved and certified by vapor emission floor treatment manufacturer.

- B. Materials used in the formulation of the product shall be in accordance with all local, State, and Federal air quality and environmental control standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original sealed containers, clearly marked with the manufacturer's name and brand name.
- B. Store materials in accordance with manufacturer's recommendations.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace waterproofing that do not comply with requirements.
 - 1. Warranty Period: 10 years from date of Project completion.
- B. Special Installer's Warranty: signed by Installer, covering Work of this Section, for warranty period of 2 years.
 - 1. Water proofing: Include coverage for materials and workmanship.
 - 2. Warranty shall include coverage for removal and replacement of materials concealing water proofing.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Vapor Emission Floor Treatment: Silicate-based solution to penetrate on-grade concrete floor surfaces to perform a protective crystalline moisture barrier. The product shall:
 - 1. Have a solids content less than 20 percent.
 - 2. Be alkali neutralizing.
 - 3. Reduce negative-side moisture migration through the concrete to allow resilient flooring systems to bond properly to the substrate.
 - 4. Provide an average reduction of at least 70 percent in the depth of water penetration at 101.5 psi over untreated concrete of the same type in accordance with ASTM C1315.
 - 5. Provide an average increase of at least 20 percent in compressive strength over untreated concrete of the same type in accordance with DIN 1048-1 and DIN 1048-2, Compressive Strength.
 - 6. Be compatible with adhesives and resilient flooring materials to be installed.
- B. Accessory Materials: As recommended by manufacturer for intended application.

2.2 MANUFACTURERS

- A. Creteseal; CS-2000.
- B. Carlisle Coatings & Waterproofing Incorporated; CCW-525-H.
- C. Approved Equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing concrete conditions are suitable to receive the work of this Section.
- B. Repair concrete where required according to manufacturer's recommendations.
- C. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Apply to structurally sound concrete surfaces, free of voids and cracks.
- B. Use mechanical cleaning methods as required: shotblasting, sandblasting, scabbing, or hydroblasting to remove existing paints, coatings, curing compounds, adhesives, sealers, hardeners, laitance, efflorescence, dirt, grease, oil, and any other contaminant that may inhibit the product's penetration. Do not grind.
- C. Use manufacturer's adhesive remover, cleaner, and degreaser where required prior to mechanical cleaning.

3.3 APPLICATION

- A. Dampen all concrete with clean water to the point of saturation. Allow approximately 30 minutes for the concrete to absorb the water. Squeegee or broom out excess water to avoid diluting the product.
- B. Spray apply two uniform, "wet-on-wet" flood coats on the pre-dampened concrete at the rate of 200 square feet per gallon, applied at right angles to each other in a cross-hatched manor. Use low pressure power sprayer or airless paint spraying rig (0.025 avg. tip size). Do not dilute the product.
- C. Squeegee or broom out excess product that puddles one hour after application.
- D. If the proposed floor covering requires additional smoothing or leveling to the substrate, use a manufacturer's recommended product.

3.4 PERFORMANCE

- A. Vapor emissions floor treatment shall reduce vapor emissions from on-grade slabs to levels that will satisfy resilient flooring manufacturers' requirements and warranty.
- B. Vapor emissions floor treatment shall prevent negative side moisture migration through the concrete floor and shall allow for all types of flooring surface treatment systems.

- C. Vapor emissions floor treatment shall be alkali-neutralizing and shall penetrate into concrete materials and chemically form a protective crystalline barrier between the surfaces of the concrete and applied flooring. The inner barrier so formed shall not be affected by ultra-violet light, abrasion and chemicals, and shall perfectly seal and waterproof the concrete against the harmful effects of water intrusion, freeze-thaw cycle damage, de-icing salts, and chloride migration.

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Blanket insulation.
 - 2. Related accessories.
- B. Related Sections:
 - 1. Section 01 81 13 - Sustainable Design Requirements

1.2 REFERENCES

- A. ASTM C272 - Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
- B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- C. ASTM C665 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- E. ASTM D2103 - Polyethylene Film and Sheeting.
- F. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products
- G. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Product Data
 - 1. Product Data: For each type of product indicated.
 - 2. For glass-fiber products, include printed statement of VOC content and ASTM D 5116 emission test results.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.4 QUALITY ASSURANCE

- A. When tested in accordance with ASTM E84, flame-spread rating of insulation materials shall not exceed 25, smoke density shall not exceed 450.
- B. Materials used in fire rated assemblies shall bear the U.L. (or other approved testing laboratory) classification marking.

1.5 DELIVERY, HANDLING, AND STORAGE

- A. Deliver and store insulation in the manufacturer's original packaging, clearly identified with manufacturer's name, and name, type, and thickness of insulation.
- B. Store insulation indoors, protected from moisture and other sources of damage.
- C. Follow additional requirements of the manufacturer.
- D. Delivery, handling and storage shall be in accordance with Division 1.

1.6 PROJECT CONDITIONS

- A. Do not install insulation until building is sufficiently enclosed or protected against absorption of moisture by the insulation, and do not install insulation unless supporting framing and surrounding construction is in a thoroughly dry condition.

PART 2 PRODUCTS

2.1 BLANKET INSULATION

- A. Materials: ASTM C665; glass fiber or mineral fiber units; unfaced unless otherwise indicated.
 - 1. Flame spread rating of insulation materials.
 - 2. Smoke density shall not exceed 450.
- B. Manufacturers:
 - 1. Owens-Corning; Fiberglass FS25.
 - 2. Manville; Flame-Resistant FSK.
 - 3. Certainteed; Flame Resistant FSK.
- C. Location:
 - 1. Exterior Walls with wood studs: Type I, R-13 unless otherwise indicated.
 - 2. Attic insulation: Type I, R-30.
- D. Width: As required to fit framing.
- E. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
 - 1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
 - 2. Low Emitting: Insulation tested according to ASTM D5116 and shown to emit less than 0.05-ppm formaldehyde.

2.2 ACOUSTICAL SOUND ISOLATION INSULATION

- A. Material: ASTM C665, Type I; unfaced, glass fiber or mineral fiber units.
 - 1. Thickness: Nominal 2 3/4 inches, unless otherwise indicated.
- B. Location: Concealed within partition around the Sheriff Office.
- C. Manufacturers:
 - 1. Manville; Sound Control Batts
 - 2. Owens Corning; Fiberglas Commercial Insulation Blankets

3. Certainteed; Sound Control Batts

2.3 INSTALLATION MATERIALS

- A. Adhesive for Bonding Insulation:
 1. Type recommended by insulation manufacturer, and complying with requirements for fire performance characteristics of insulation with which used.
 2. VOC Content: Not more than 80 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Mechanical Fasteners:
 1. Type recommended by insulation manufacturer and capable of securely and rigidly fastening insulation in place.
 2. Unless otherwise noted, 12 gauge wire between framing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces to receive thermal and acoustical insulation are satisfactory for their installation.
- B. Verify that substrate, adjacent materials, and insulation are dry.
- C. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Blanket Insulation
 1. Install insulation where indicated, as specified, and in accordance with the manufacturer's printed instructions; fasten in place with manufacturer recommended fastening method.
 2. Install with factory applied membrane facing toward building interior unless otherwise indicated.
 3. Install snugly between framing members, with ends snugly fitted between units and against adjacent construction.
 4. Install attic insulation between fusses stapling the flanges to the bottom trusses.
 5. Carefully cut and fit insulation around pipes, conduit, and other obstructions and penetrations.
 6. Where door and window frames occur in framing, cut additional strips of insulation and hand-pack as necessary to thoroughly fill voids in and around such frames.
 7. Do not fill indicated air spaces with insulation.

END OF SECTION

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SECTION 073113
ASPHALT SHINGLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fiberglass shingles.
 - 2. Moisture shedding underlayment.
- B. Related Sections:
 - 1. Section 07 60 00 - Flashing and Sheet Metal.

1.2 REFERENCES

- A. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- B. ASTM D228 - Test Methods for Sampling Testing and Analysis of Asphalt Roll Roofing, Cap Sheets and Shingles used in roofing and waterproofing.
- C. ASTM D3018 - Class A Asphalt Shingles Surfaced with Mineral Granules.
- D. ASTM D3161 - Wind-Resistance of Asphalt Shingles.
- E. ASTM D6381 - Measurement of Asphalt Shingles Mechanical Uplift Resistance.

1.3 SUBMITTALS

- A. Submit in accordance with Section Division 1.
- B. Product Data: Include manufacturer's product literature and installation instructions.
- C. Credit SSc7.2; Product SRI index, a roofing system achieving a COOL ROOF RATING.
- D. Samples: Submit samples for color and texture selection. After selection, submit full size shingles for verification.
- E. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this Section with minimum 3 years experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in sealed packaging with manufacturer's labels intact and legible.
- B. Delivery, handling and storage shall be in accordance with Division 1.

1.6 PROJECT CONDITIONS

- A. Do not install shingles when ambient temperatures are below 50 degrees F.

1.7 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 - b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.
 - 2. Material Warranty Period: 25 years from date of Project completion, prorated, with first three years non-prorated.
 - 3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 60 mph for 5 years from date of Project completion.
 - 4. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 5 years from date of Project completion.
 - 5. Workmanship Warranty Period: 10 years from date of Project completion.
- B. Special Project Warranty: Roofing Installer's Warranty, or warranty form at end of this Section, signed by roofing Installer, covering the Work of this Section, in which roofing Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 2 years from date of Project completion.

1.8 REGULATORY REQUIREMENTS

- A. Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.
- B. Provide a roofing system achieving an ENERGY STAR® rating. Install all roofing products in accordance with all federal, state and local building codes.
- C. Provide a roofing system achieving a COOL ROOF RATING COUNCIL (CRRC) Install all roofing products in accordance with all federal, state and local building codes.
- D. All work shall be performed in a manner consistent with current OSHA guidelines.

1.9 MATERIALS

- A. Shingles: ASTM D3018, Class A, Type I; glass fiber mat base, mineral granule surface; self-sealing; three square tab; color selected by the Owner Representative from manufacturer's standards.
- B. Roll Roofing: No. 90 asphalt saturated roll roofing; surfaced on weather side with mineral granules to match shingles.
- C. Underlayment: ASTM D226, No. 15 unperforated asphalt saturated felts; 36 inch width.
- D. Nails: Aluminum or hot-dip galvanized steel; 11 or 12 gauge sharp pointed roofing nails with barbed shanks; minimum 3/8-inch diameter head, length as required to penetrate 3/4 inch into solid decking.

- E. Plastic Cement: Type compatible with materials to which applied, free of toxic solvents, capable of setting in 24 hours at temperatures of 75 degrees F and 50 percent relative humidity.
- 1.10 MANUFACTURERS - FIBERGLASS SHINGLES
- A. GAF; Sentinel
 - B. Manville
 - C. Owens-Corning; Duration Premium Cool Roof (Basis of Design) Frosted Oak
 - D. Celotex

PART 2 EXECUTION

2.1 EXAMINATION

- A. Verify conditions are satisfactory to receive the work of this Section.
- B. Verify that roof penetrations and plumbing stacks are in place.
- C. Verify that flashings have been properly installed.
- D. Verify that roof openings are correctly framed prior to installing the work of this Section.
- E. Verify deck surfaces are dry, free of warps, ridges, or voids.
- F. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

2.2 PREPARATION

- A. Broom clean deck surfaces prior to installation of the work of this Section.

2.3 INSTALLATION

- A. Underlayment
- B. Install one layer of underlayment, weather lapped minimum 2 inches.
- C. Fasten with nails to hold in place until application of shingles. Type, spacing and size of fasteners in accordance with manufacturer's installation instructions.
- D. Shingles
 1. Install starter strip of roll roofing or inverted shingles with tabs removed.
 2. Install shingles in accordance with manufacturer's instructions.
 3. Place shingles in straight coursing pattern with 5-inch weather exposure, using horizontal and vertical chalk lines to ensure straight coursing.
 4. Place first course of shingles 3/4 inch beyond fascia board.
 5. Extend shingles 1/2 inch beyond face of gable edge fascia boards.
 6. Cap hips and ridges with individual shingles maintaining weather exposure. Place to avoid exposed nails.
 7. After installation, place one daub of plastic cement, one inch diameter under each individual shingle exposed to weather, to prevent lifting.

8. Coordinate installation of roof mounted components and work projecting through roof to ensure weather tight placement.
9. Complete installation to provide weather tight service.

2.4 PROTECTION

- A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 074600

HARDBOARD SOFFIT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiber cement lap panels and accessories.

1.2 RELATED SECTIONS

- A. Section 01 81 00 - Sustainability Requirements
- B. Section 06 17 53 - Shop-Prefabricated Wood Trusses
- C. Section 06 16 00 - Sheathing

1.3 REFERENCES

- A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
- B. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Credits MRc4; for products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content, the manufacturer, and the source of the recycled content data.
- D. Shop Drawings: Provide detailed drawings of a typical non-standard application of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 2 years' experience with installation of similar products.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Product Warranty: Limited product warranty against manufacturing defects.
 - 1. Hardie Soffit Panels for 10 years.
- B. Workmanship Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: James Hardie Building Products, Inc; Email: [request info \(info@jameshardie.com\)](mailto:request_info@jameshardie.com); Web: www.jameshardiecommercial.com
- B. Requests for approval of equal substitutions will be considered in accordance with provisions of Division 1.

2.2 SOFFIT

- A. Code Compliance Requirement for Materials:
 - 1. 4'x 8' Non-vented smooth panels.
 - 2. Non-asbestos fiber-cement siding where required to be non-combustible shall be tested in accordance with ASTM E136.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until framing have been properly prepared.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION - HARDIE SOFFIT PANELS

- A. Install Hardie Soffit panels per manufacturer's instructions.
- B. Additional framing may be needed to ensure proper fastening.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 076000

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Galvanized sheet metal.
 - 2. Attic Ventilation.
 - 3. Hanging Gutters.
 - 4. Downspout.

- B. Related Sections:
 - Section 05 50 00 - Metal Fabrications.
 - Section 06 10 00 - Rough Carpentry: Wood blocking, nailers, and grounds.
 - Section 07 31 13 – Asphalt Shingles.
 - Section 07 90 00 - Joint Protection.
 - Section 09 90 00 - Painting and Coatings

1.2 REFERENCES

- A. AA (Aluminum Association) - Aluminum Construction Manual: Aluminum Sheet Metal Work and Building Construction.

- B. AISI (American Iron and Steel Institute) - Stainless Steel - Uses in Architecture.

- C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

- D. ASTM A240/A240M - Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

- E. ASTM A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

- F. ANSI/ASTM B32 - Solder Metal.

- G. FS O-F-506 - Flux, Soldering, Paste and Liquid.

- H. NRCA - National Roofing Contractors Association: Roofing Manual.

- I. SMACNA - Architectural Sheet Metal Manual.

1.3 QUALITY ASSURANCE

- A. Applicator: Company specializing in sheet metal flashing work with minimum three years experience.

B. Pre-installation Conference:

Convene pre-installation conference in accordance with Division 1.

Attend conference with roofing installer, roofing manufacturer's representative, General Contractor and the Owner's Representative.

1.4 SUBMITTALS

A. Shop Drawings: Indicate overall layout of sheet metal work; type, thickness, and details of sheet metal components; joints, expansion joints, attachment and anchoring of sheet metal components.

B. Warranties: Sample of special warranties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver flashing and sheet metal wrapped for protection and marked to facilitate identification.

B. Stack preformed [and prefinished] material to prevent twisting, bending, or abrasion, and to provide ventilation.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

D. Store and handle in protective wrapping until ready for use.

1.6 PROJECT CONDITIONS

A. Field Measurements: Before fabricating sheet metal, verify shapes and dimensions of surfaces to be covered.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate Work of this Section with work of other Sections whose work affects or is affected by the Work of this Section.

1.8 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM 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. Warranty Period: 10 years from date of Project completion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Sheet Metal:
 - 1. Sheet metal, unless otherwise specified or indicated, shall be 24 gauge zinc-Coated (Galvanized) Steel Sheet conforming to ASTM A653/A653M, G90 (Z275) coating designation; structural quality, mill phosphatized for field painting.
 - 2. Provide associated trim, corner plates, clips, joint covers, and similar items, as required for a complete and watertight installation.

- B. Attic Ventilation
 - 1. Manufacturer:
 - a. Vulcan Vent manufactured Gunter Manufacturing.
 - 2. Gable vents: 24" dia. ember and fire intrusion resisting vent in compliance with State Fire Marshal.
 - 3. Eave Vent: 3½"x 14" ember and fire intrusion resisting vent in compliance with State Fire Marshal.

- C. Hanging Gutters:
 - 1. Hanging Gutters shall be fabricated from 24 gauge galvanized steel, unless otherwise indicated with leaf screens to avoid accumulation.

- D. Downspouts:
 - 1. Fabricate downspouts of 24 gauge galvanized steel unless otherwise indicated.

- E. Fasteners:
 - Material:
 - 1. Non-corrosive or hot-dipped galvanized, compatible with flashing and sheet metal material.
 - 2. Provide stainless steel fasteners for stainless steel sheet metal.
 - Type and Size:
 - 3. Nails, rivets, sheet metal screws as indicated and as required to hold flashing and sheet metal securely in place.
 - 4. Where sheet metal is installed over other sheet metal, fasten through 1-inch diameter tinned discs.
 - Spacing: 3-inches on center, unless otherwise indicated.

- F. Solder: ASTM B32, Alloy Grade 50A.

- G. Flux: FS O-F-506.

- H. Sealant: Type specified in Section 07 90 00.

2.2 FABRICATION

- A. Field-fabricate only those items that cannot be fabricated in the shop.

- B. Fabricate products in accordance with the reviewed approved Shop Drawings and the SMACNA Architectural Sheet Metal Manual referenced standard, and NRCA Roofing Manual.

- C. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- D. Form pieces in longest practical lengths.
- E. Form flashing and sheet metal to fit snugly and without sharp edges.
- F. Form seams neatly, and make straight.
- G. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- H. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- I. Fabricate flashings vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- J. Joints
 - 1. Make joints watertight and allow for expansion.
 - 2. Reinforce sheet metal corners as required.
 - 3. Conceal reinforcement within finished assembly.
- K. Fastenings: Use concealed hook strips and fasteners. Exposed hook strips and fasteners not acceptable.

2.3 FINISH

- A. Galvanized Items: Mill phosphatized for painted finish in accordance with Section 09 90 00.
- B. Backpaint concealed metal surfaces with one coat protective backing paint.
- C. Coat contacting dissimilar metals with protective compound.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the installation of flashing and sheet metal.
- B. Verify roof openings, wall opening, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, cant and strips are in place, and nailing strips located.
- C. Verify roofing membrane termination and base flashings are in place, sealed, and secure.
- D. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Remove dirt, foreign objects, and foreign materials from surfaces to receive flashing and sheet metal.
- B. Surfaces shall be clean, smooth, even, and free from defects prior to installation.

3.3 INSTALLATION

- A. Soldering:
 - 1. Clean contact surfaces before soldering.
 - 2. Perform soldering so as to thoroughly heat sheet metal and completely sweat solder through full seam width to produce joint of flowed solder 1-inch wide.
 - 3. Sweat lock seams full of solder flat and straight; clean with acid flux after soldering, and wash thoroughly.
- B. Mechanical Fastening:
 - 1. Join parts with concealed rivets or sheet metal screws, type and spacing in accordance with manufacturer installation instructions, NRCA Roofing Manual and approved shop drawings. Place sheets together before drilling.
- C. Lap Joints:
 - 1. Where lap joints are used, lap sheets at least 4 inches.
 - 2. Provide bead of sealant across lapped joints, placed 1 inch from exposed edge of joint.
- D. Butt Joints:
 - 1. Where butt joints are used, provide concealed backing alignment plates or sleeves fitted to one side of joint.
- E. Perform cutting, fitting, drilling, and similar work as required to accommodate the Work of other Sections.
- F. Hanging Gutters:
 - 1. Lap joints between sections 1-1/2 inches, rivet and solder.
 - 2. Provide loose locked expansion joints midway between outlet tubes to provide for 1-1/2 inches movement in both directions.
 - 3. Provide expansion joints with cover strips in a manner to provide free movement and watertight connection.
 - 4. Form outlet tubes of same material and thickness as gutter and lock and solder the longitudinal seam.
 - 5. Flange the upper end of tubes and rivet and solder to the lining.
 - 6. Extend tubes into downspouts at Support Gutters with 20 gauge strap hangers and install spreaders at midpoint between hangers.
- G. Downspouts:
 - 1. Telescope end joints 1-1/2 inches and lock longitudinal joints.
 - 2. Hold downspouts in position 1 inch clear of the wall with 1/16 inch by 1 inch galvanized steel downspout straps spaced not more than 10 feet on center and securely fasten to the wall with expansion anchors.

3.4 CLEANING

- A. Following installation, clean exposed surfaces of flashing and sheet metal of excess solder and dirt; remove grease and oil with appropriate solvent; wipe surfaces with clean rags, and leave in condition suitable for the application of paint.

END OF SECTION

SECTION 079000
JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preparing sealant substrate surfaces.
 - 2. Sealant and backing.

- B. Related Sections:
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Sealants used in conjunction with Building Components as indicated in all divisions.

1.2 REFERENCES

- A. ASTM C732 - Aging Effects of Artificial Weathering on Latex Sealing Compounds.
- B. ASTM C834 - Latex Sealing Compounds.
- C. ASTM C881 - Epoxy-Resin Base Bonding Systems for Concrete.
- D. ASTM C882 - Test Method for Bond Strength of Epoxy - Resin Systems Used with Concrete by Slant Shear.
- E. ASTM C920 - Elastomeric Joint Sealants.
- F. ASTM D695 - Compressive Properties of Rigid Plastics.
- G. ASTM D2240 - Test Method for Rubber Property-Durometer Hardness.

1.3 SUBMITTALS

- A. Product Data
 - 1. For sealants and sealant primers used inside the weatherproofing system, including printed statement of VOC content.
- B. Samples: Submit showing the standard colors available for each sealant material intended for installation in an exposed location.
- C. Certificates: Submit certificate that materials specified and proposed for use are suitable for intended application.
- D. Manufacturer's installation instructions.
- E. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Applicator: Company with minimum 3-years experience in the application of materials of the type specified in this Section.
- B. Regulatory Requirements: Joint Sealers shall meet all current limits set by regulatory agencies regarding Volatile Organic Compounds (VOC) or SCQAMD rule 1168.

1.5 FIELD SAMPLES

- A. Provide field samples in accordance with Division 1.
- B. Construct field sample panel of size reviewed by the County Representative, illustrating sealant types, colors, and tooled surfaces.
- C. Locate as directed.
- D. Accepted sample may remain as part of the Work.

1.6 MOCK-UPS

- A. Provide sealant and related accessories for mock-ups in accordance with Division 1.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, and lot numbers where appropriate.
- B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.

1.8 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Failures include but are not limited to the following:
 - a. Air and/or water penetration.
 - b. Loss of adhesion or cohesion.
 - c. Failure to cure.
 - 2. Warranty Period: Two years from date of Project completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Failures include but are not limited to the following:
 - a. Loss of adhesion or cohesion.
 - b. Failure to cure.
 - 2. Warranty Period: 2 years from date of Project completion.

- C. C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.1 MATERIALS, GENERAL

- A. A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Architectural Sealants: Not more than 250 g/L.
 2. Nonmembrane Roof Sealants: 300 g/L.
 3. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 4. Sealant Primers for Porous Substrates: Not more than 775 g/L.
 5. Modified Bituminous Sealant Primers: 500 g/L.

2.2 SEALANTS

- A. Type A Sealant:
1. Manufacturers:
 - a. Euclid Chemical Company; Eucolastic II - Pourable.
 - b. Mameco International; Vulkem 245.
 - c. Pecora Corp.; Urexpan NR-200.
 - d. Sika Corp.; Sikaflex 2C-SL.
 - e. Sonneborn Building Products; Sonolastic SL II.
 2. Multiple components, self-leveling polyurethane based sealant in accordance with ASTM C920, Type M, Grade P, Class 25.
- B. Type B Sealant: Not used
- C. Type C Sealant:
1. Manufacturers:
 - a. Euclid Chemical Company; Euco #452 Gel.
 - b. Sika Corporation; Sikadur 31 Hi-Mod Gel.
 - c. Pecora Corporation; Dyna-Poxy EP-1200.
 2. High solids, two component epoxy resin; ASTM C881, Type 1, Grade 3, Classes B and C.
 3. Compressive Strength: 10,000 psi in 7 days when tested in accordance with ASTM D695 at 75 degrees F and 50 percent relative humidity. Material shall attain 75 percent ultimate strength within 16 hours.

- D. Type D Sealant:
1. Manufacturers:
 - a. Adco Seal; No. B-100.
 - b. Pecora Corp.; BC-158.
 - c. PTI Sealants ; No. 707.
 - d. Tremco; Butyl Sealant.
 2. Butyl rubber based sealant in accordance with ASTM C920, Type S, Grade NS, Class 7.5.
- E. Type E Sealant:
1. Manufacturers:
 - a. Pecora Corp.; AC-20.
 - b. Sonneborn Building Products; Sonolac.
 - c. Tremco; Acrylic Latex Caulk.
 2. Latex acrylic based sealant in accordance with ASTM C834.
- F. Type F Sealant:
1. Manufacturers:
 - a. Dow Corning Corp.; No. 795.
 - b. General Electric Co.; Silpruf.
 - c. Pecora Corp.; 864.
 - d. Sonneborn Building Products; Omniseal.
 - e. Tremco, Spectrem 1.
 2. Low-modulus silicone sealant in accordance with ASTM C920, Type S, Grade NS, Class 50.
- G. Type G Sealant: Not used
- H. Type H (Acoustical) Sealant:
1. Tape:
 - a. Manufacturers:
 - 1) Arlon; Series 6A.
 - 2) Norton Co.; Norseal V30 Series.
 - 3) Williams Products, Inc.; U-Gasket.
 - b. Polyvinylchloride foam tape with pressure sensitive adhesive on one side, 3/4 inch wide by the thickness required to accommodate unevenness of substrate and completely fill openings between partition framing and building floors and concrete or masonry walls.
 2. Compound:
 - a. Manufacturers:
 - 1) Ohio Sealants; Sound Caulk (solvent type).
 - 2) Pecora Corp.; BA-98.
 - 3) Tremco; Acoustical Sealant.
 - b. Permanently resilient type manufactured specifically for acoustical applications.

2.3 MISCELLANEOUS MATERIALS

- A. Backer Rod:
 - 1. Material: Closed-cell foam, non-staining, non-gassing, resilient material such as neoprene, butyl, or polyurethane, compatible with sealant to be used.
 - 2. Sized and shaped to control depth of sealant and to provide 20 percent to 50 percent compression upon insertion.
- B. Joint Cleaner:
 - 1. For metal and glass: Xylol, xylene, toluol, or toluene.
 - 2. For removing lacquer coatings: Lacquer thinner.
- C. Primer: As recommended by sealant manufacturer for use intended.
- D. Masking Tape: Pressure-sensitive adhesive paper type.
- E. Bond Breaker: Pressure-sensitive adhesive polyethylene tape.

2.4 SEALANT COLORS

- A. Sealant color for use in exposed locations shall be as selected by the County Representative from manufacturer's standard colors.
- B. Wherever sealants are not exposed to view, provide manufacturer's standard color which has the best overall performance characteristics for the application indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect joints to be sealed to determine if conditions are satisfactory for the proper installation of joint sealants.
- B. If unsatisfactory conditions exist, do not commence Work until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 GENERAL

- A. Provide sealant wherever necessary to:
 - 1. Prevent light leakage.
 - 2. Prevent moisture leakage.
 - 3. Facilitate cleaning and sanitation.
 - 4. Seal exposed joints around door and window frames, signs, display boards, casework, fire alarm boxes, plumbing fixtures, electrical device cover plates, light fixtures, and other items indicated to be set in sealant.

3.3 PREPARATION

- A. Cleaning: Clean joint surfaces, using joint cleaner as necessary, of dust, dirt, oil, grease, rust, lacquers, laitance, release agents, moisture, and other matter which could adversely affect adhesion of sealants.
- B. Masking: Mask areas adjacent to joints.
- C. Priming: Apply primer, if required, in accordance with manufacturer's printed instructions.
- D. Joints shall enclose sealant on three sides.
 - 1. Where adequate joints for sealants have not been provided, suitable joints shall be cleaned out to the depth required, or as indicated, and ground to a minimum width of 1/4 inch without damage to the adjoining Work, unless otherwise specified or indicated.
 - 2. No grinding shall be performed on metal surfaces.

3.4 APPLICATION

- A. Install sealant and backing materials in accordance with manufacturer's instructions.
- B. Apply in accordance with manufacturer's instructions regarding ambient temperature for application and curing.
- C. Install backing materials in joints using blunt instrument to avoid puncturing.
 - 1. Do not twist backing while installing.
 - 2. Install backing so that joint depth is 50 percent of joint width, minimum 1/4 inch deep.
- D. Apply sealants in joints using pressure gun with nozzle cut to fit joint width.
- E. Place sealants in uniform, continuous beads without gaps or air pockets.
- F. Tool joints to required configuration within 10 minutes of sealant application.
- G. If masking materials are used, remove immediately after tooling.
- H. Seal joints adjacent to painted Work before the final coat of paint is applied.
- I. Verify adhesion of sealants to substrates.

3.5 CLEANING

- A. Remove spilled and excess materials adjacent to joints without damaging adjacent surfaces.
- B. Leave finished Work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.

3.6 SCHEDULE

- A. Type A:
 - 1. Joints in concrete and paved surfaces subject to foot traffic.
- B. Type C:

1. All construction joints, window and hollow metal frame perimeters, and bedding of furnishings, equipment, plumbing fixtures, electrical fixtures, and other items fastened to wall, ceiling, and floor surfaces.
 2. Do not apply Type C sealant until all building wall and roof loads have been imposed for a period of not less than 7 days.
- C. Type D:
1. Interior wall penetrations for pipe and conduit that will be concealed by escutcheons and other trim and plate, and for lap joints in sheet metal.
- D. Type E:
1. Joints, voids and penetrations not otherwise specified for interior surfaces exposed to view and requiring painting.
 2. Bedding of fixtures, partitions, equipment and accessories fastened to walls and floors, and flanges and escutcheons of items penetrating surfaces in the following locations: kitchens, dining rooms, staff and public toilet rooms, other areas requiring sanitary conditions to eliminate any open joints between contact surfaces.
- E. Type F:
1. Exterior and interior joints in contact with organically-coated aluminum.
 2. Exterior and interior vertical joints in concrete, except as otherwise specified.
 3. Exterior joints in masonry and portland cement plaster.
 4. Around metal door, window and louver frames penetrating exterior concrete, masonry and portland cement plaster surfaces, except as otherwise specified.
- F. Type H:
1. Perimeter joints around sound-retardant partitions and electrical boxes and other penetrations in such partitions.
- G. Conflicts:
1. In the event of conflict between the above Schedule and sealant type indicated on Drawings, notify the County Representative.
 2. The County Representative will determine sealant type to be installed in location in question.
 3. Install sealant type directed by the County Representative, complete with all necessary joint preparation and accessories.

END OF SECTION

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SECTION 081613

FIBERGLASS DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. French out swinging fiberglass doors.
- B. Related Sections
 - 1. Section 08 80 00 - Glazing.
 - 2. Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

- A. Steel Door Institute (SDI)
 - 1. ANSI/AAMA/101/I.S.2 - Air Leakage, Water Resistance, Structural Test.
 - 2. NFRC 100 - Thermal Performance
 - 3. ASTM F 842-04 -. Forced-Entry Resistance
 - 4. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
 - 5. U.L. - Underwriters Laboratories Inc.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data: Provide manufacturer's standard details and catalog data demonstrating compliance with referenced standards. Provide installation instructions.
- C. Samples: Submit for approval the following:
 - 1. Color Samples: Minimum 1x4 inch (25x100 mm) paint color chips on fiberglass substrate.
 - 2. Glass, showing specified tint color. 6 inch x 6 inch samples of each color of factory finish specified.

1.4 CERTIFICATIONS

- A. U-Factor and structural rating charts required for AAMA and NFRC labeling requirements.
- B. NFRC: Doors shall be NFRC certified with temporary U-factor label applied to glass and an NFRC tab added to permanent AAMA frame label

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum five years' experience in producing fiberglass doors.
- B. AAMA: Doors shall be Silver Label certified with label attached to frame per AAMA requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect products from moisture, construction traffic, and damage.
- B. Store under cover.
- C. Place units on 4-inch high wood sills or in a manner that will prevent rust or damage.
- D. Do not use non-vented plastic or canvas shelters.
- E. Should wrappers become wet, remove immediately.
- F. Provide 1/4 inch space between doors to promote air circulation.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Milgard Manufacturing, Inc.; 3000 Series(Basis of Design).
- B. Acceptable Manufacturers:
 - 1. Pella windows
 - 2. Marvin Windows

2.2 OUT SWINGING DOOR (3632U SERIES)

- A. Frame: 4-9/16 inch deep (116 mm), multi-chambered fiberglass pultrusion with optional snap in nail fin setbacks of 1-3/8 inch (35 mm) and 1 inch (25 mm).
- B. Panel Frame:
 - 1. Top Rail: Minimum 1-3/4 by 4-3/16 inch (44 by 106 mm) multi-chambered fiberglass pultrusion.
 - 2. Bottom Rail: Minimum 1-3/4 by 8-5/8 inch (44 by 219 mm) multi-chambered fiberglass pultrusion.
 - 3. Stiles: Minimum 1-3/4 by 4-3/16 inch (44 by 106 mm) multi-chambered fiberglass pultrusion.
- C. Sill: 4-9/16 inch (116 mm) deep frame: 1/2" high. (ADA compliant)
- D. Sight lines: Equal for doors and fixed panels.
- E. Structural Class: SGD-C45 (2 panel only).
- F. Hardware:
 - 1. Lock: Inside and outside lever operated latch and One Motion 3 point locking system, with 2 tapered hooks and interior thumb turn deadbolt.
 - 2. Keyed exterior cylinder lock, Schlage compatible.
 - 3. Hinges: 2-way adjustable lift-off hinges; finish to match handle set.
- G. Weatherstripping: Foam filled bulb seal. Sill Sweep: Rubber dual-fin sweep.

2.1 INTERIOR SLIDING DOOR (3000 SERIES)

- A. Size: 8'-0"x 6'-8"
- B. Hardware:
 - 1. Handle and Lock: Smart Touch Technology.
 - 2. Rollers: two sets of dual composite nylon, 1-1/2 inch (38 mm) diameter, rollers on raised monorail aluminum track.
 - 3. Sill: 4-9/16 inch (116 mm) deep frame: 1/2" high. (ADA compliant)

2.2 GLAZING

- A. Insulated Glass Units: ASTM E 774, Class A, minimum 7/8 inch (22 mm) thick overall:
 - 1. Glazing Type: Clear/SunCoat® Low-E tempered.
 - 2. Spacer Type: EdgeGardMAX™ High performance foam based warm edge spacer system.

2.3 FINISH

- A. Frame and Panel Color:
 - 1. Exterior: Color from manufacturer's selection "baked on enamel"
 - 2. Interior: Painted finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. The installer shall verify that project conditions are suitable before beginning installation of frames.
- B. Correct unsatisfactory condition before proceeding with installation.
- C. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install doors in framed walls in accordance with manufacturer's installation instructions.
 - 1. Flash head and jambs in accordance with AAMA 2400.

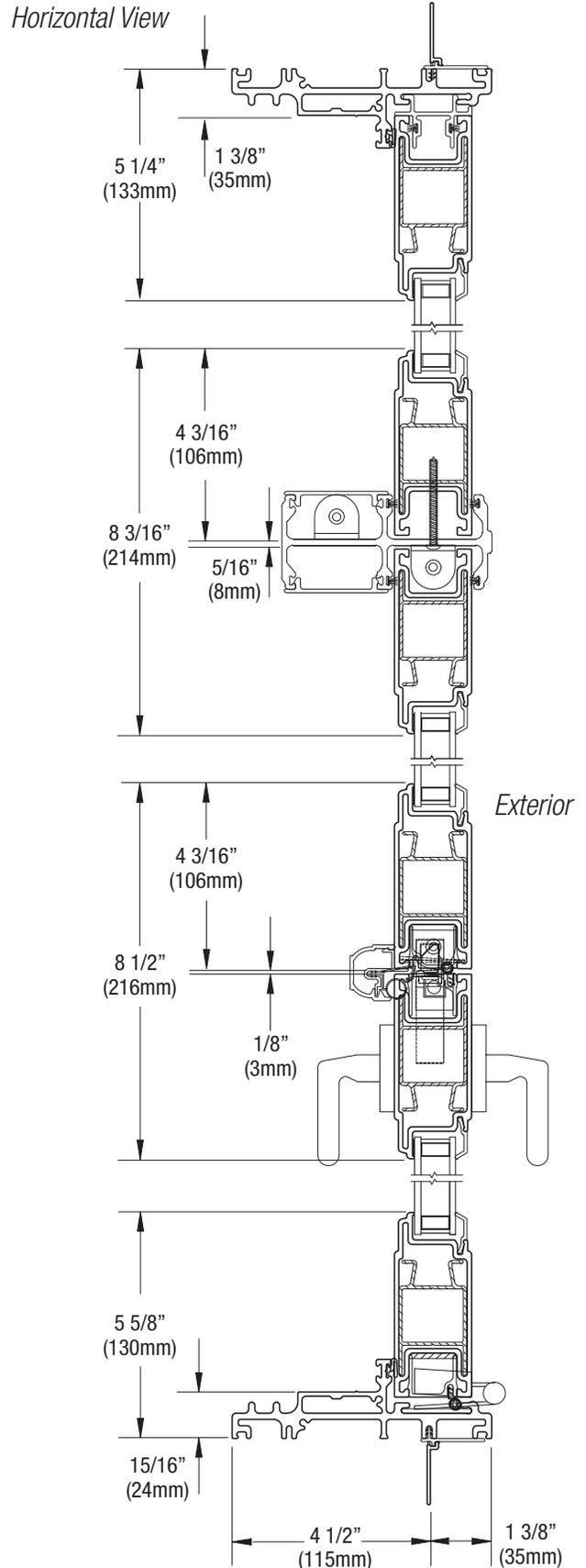
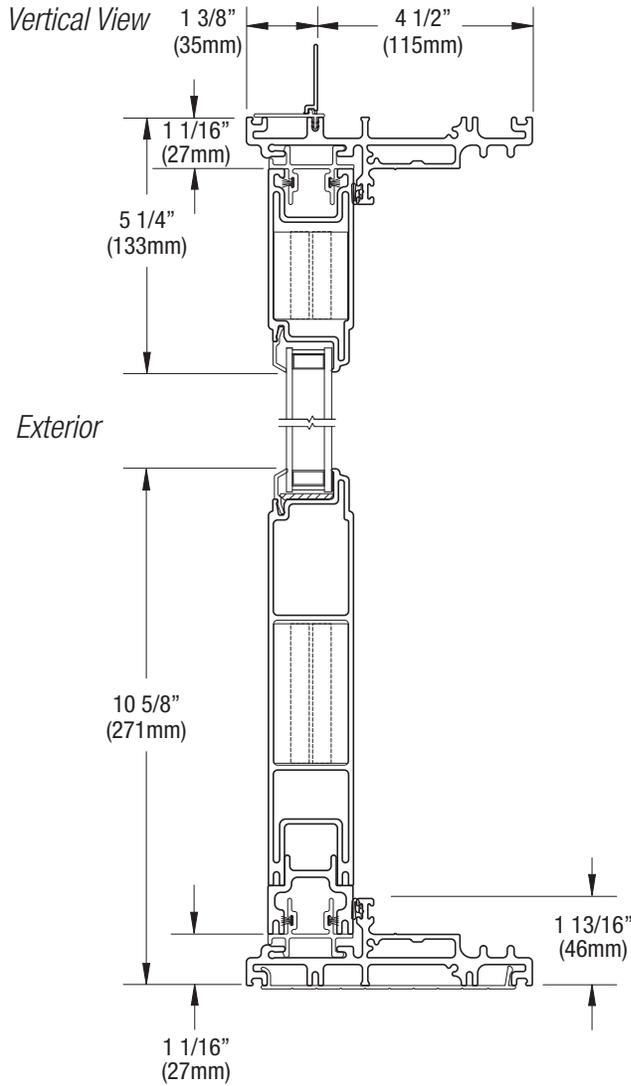
3.3 ADJUST AND CLEAN

- A. Adjust doors for proper operation, free from binding or other defects.
- B. Clean and restore soiled surfaces. Remove scraps and debris, and leave site and a clean condition.

END OF SECTION

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3623U Ultra French Door 3-Panel (XOO) Assembly Drawing

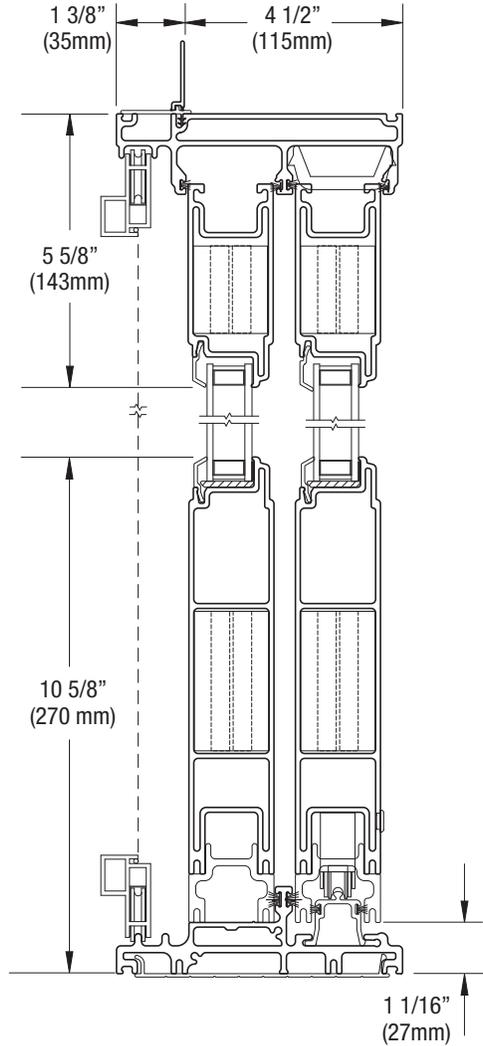


Due to continual product research and development, details may be changed at any time. ©2009
Products shown are not available at all locations – confirm availability with your local Milgard representative.

Scale: 3" = 1' (1/4 scale)

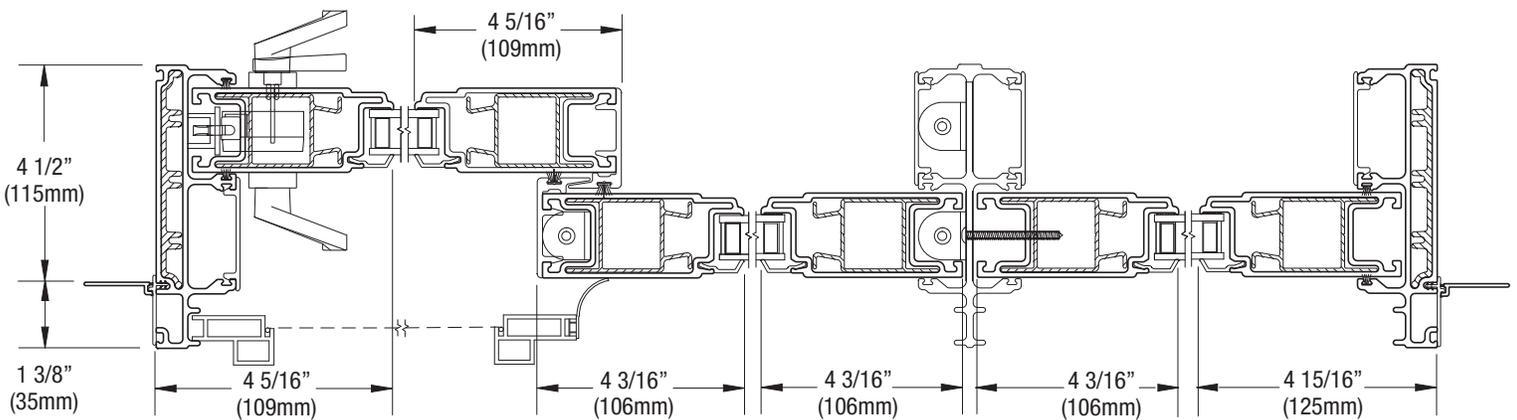
3626U Ultra Sliding French Door 3-Panel Assembly Drawing

Exterior



Vertical View

Horizontal View



Exterior

Scale: 3" = 1' (1/4 scale)

1000000000

CROSS SECTION DRAWING

FIBERGLASS OUTSWING ADA COMPLIANT 1/2" SILL PATIO DOOR

200 File Scale: 1" = 1/2" Full Size

File name: 2014_01_20_1000000000.dwg

Date: 10/20/14

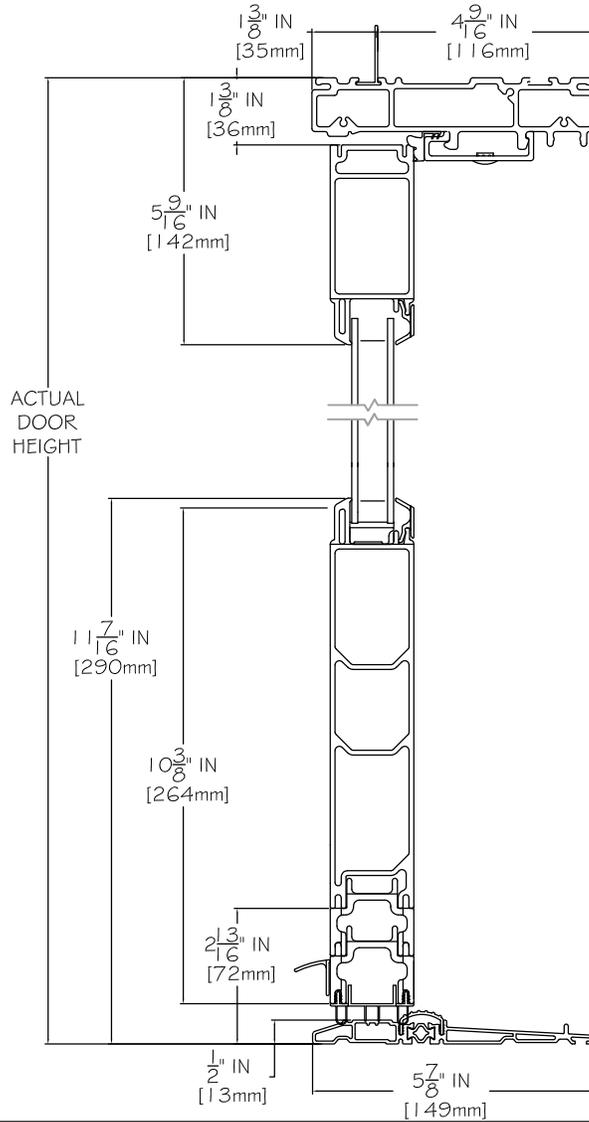
Author: [Name]

Project: [Name]

VIEW: VERTICAL

1:500 MILGARD

enigma.com





FOR IMMEDIATE RELEASE

MEDIA CONTACT:

Paul Vanderwal,
503.295.1922

paulv@thinkmh.com

MILGARD INTRODUCES NEW SLIDING PATIO DOORS WITH SMARTTOUCH™ HANDLE

LAS VEGAS (January 19, 2010) — Milgard Windows & Doors, an industry leader in window and door innovation, has introduced two newly-designed [sliding patio doors](#) to its vinyl Tuscan™ Series replacement line and Montecito™ Series for new construction applications. The new doors add to Milgard's SmartTouch family of products, incorporating [SmartTouch](#) technology into the handle hardware for increased security and nationally-recognized ease-of-use.

Milgard's patent-pending SmartTouch handle was designed to engage with a simple, one-motion operation that locks or unlocks the door with the same easy movement that opens and closes the door. Milgard's SmartTouch was honored with the Arthritis Foundation Ease-of-Use Commendation, a program that recognizes manufacturers who design user-friendly products that are easily accessible for people with functional limitations due to the effects of arthritis.

"We're proud of this innovative application of our SmartTouch system, and of our recognition from the Arthritis Foundation for its ease-of-use" said Scott Morgan, VP of Sales and Marketing at Milgard. "In addition to being attractive and easy to use, the lock and handle combination exceeds all California forced-entry requirements, among the most rigorous codes in the nation."

Other details include a glazing bead mitered at 45-degrees to effectively disappear against the matching panel miter contributing door's appearance, and new exterior handle hardware options to finish the polished look. Like all of Milgard's Tuscan Series and Montecito Series windows and doors, the new patio doors are backed by Milgard's industry-leading full lifetime warranty, with the Tuscan Series also offering Milgard's glass breakage warranty.

"Aging Baby Boomers aren't the only ones who appreciate a well-designed, easy-to-operate door," pointed out Morgan. "Milgard's new sliding patio door also offers the traditional

profiles of our Tuscany and Montecito Series windows, making this a great new choice for a patio or deck entrance.”

Other options available include:

- Milgard’s 3D® or 3D MAX® Energy Packages for increased energy efficiency
- Choice of white or tan color
- Complementary transom styles
- Standard multi-point locking on OXO and OXXO configurations
- Available triple-glazing for maximum energy efficiency on the Tuscany Series
- Blinds between the glass on the Tuscany Series
- Retractable Screen provides a clear view through closed door on the Tuscany Series
- PureView® enhanced visibility screen

For more information about Milgard’s new Tuscany Series and Montecito Series sliding glass doors with SmartTouch, visit www.milgard.com or call 1.800.MILGARD.

About Milgard Windows & Doors

Milgard Windows & Doors, a Masco company based in Tacoma, Wash., offers a full line of aluminum, vinyl and fiberglass windows and patio doors for builders, dealers and homeowners. The company has been recognized for manufacturing the nation’s highest quality vinyl windows six times in a yearly survey sponsored by Hanley-Wood Inc., publishers of Builder magazine. Milgard employs approximately 3,500 people nationwide. For more information, visit www.milgard.com or call 1.800.MILGARD.

About Masco Corporation

Headquartered in Taylor, Mich., Masco Corporation (NYSE: MAS) is one of the world’s largest manufacturers of brand-name consumer products for the home and family. Masco is also a leading provider of services that include the installation of insulation and other building products. For more information, visit www.masco.com or call 313.274.7400.

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SECTION 081713

INTEGRATED WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-hung flush wood doors; non-rated. Door system components include: door panel, door frame, hinges.

1.2 RELATED SECTIONS

- A. Section 062000 - Finish Carpentry: Wood Door Frames

1.3 REFERENCES

- A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.
- B. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
- C. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- D. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.
- E. WI (Manual) - Manual of Millwork; Woodwork Institute.

1.4 SUBMITTALS

- A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- B. Specimen warranty.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria.
- D. Samples: Submit two samples of door construction, 12 inches by 16 inches in size cut from top corner of door.
- E. Samples: Submit two samples of door veneer, minimum 12 inches by 16 inches in size illustrating wood grain, stain color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

- B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.8 WARRANTY

- A. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 DOORS

- A. Masonite (Basis of Design).
 - 1. Quality Level: Premium Grade with A grade veneer, in accordance with WI - Manual of Millwork, Section 12.
 - 2. Wood Veneer Faced Doors: 3-ply.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction. Flush doors shall be fabricated using loose lay-up assembly that includes wood veneer or hardboard facings, wood stiles, wood rails and corrugated cell core. Door facings are to be bonded to stiles, rails and core forming a 3-ply structural attachment.
- C. Acceptable manufacturers:
 - 1. Lynden Doors
 - 2. Marshfield Doors

2.2 DOOR FACINGS

- A. Wood Veneer Facing for Transparent Finish: Species as specified above, veneer grade as

specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.

1. Vertical Edges: Any option allowed by quality standard for grade.
2. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.

B. Facing Adhesive: Type I - waterproof.

2.3 DOOR HARDWARE

A. Mounting surface for latching hardware to be reinforced with solid internal support. Hinge preparations for 1-3/4" thick doors to be machined to accept 4" hinges. Latch preparations are to be placed in the area of solid internal supports. Face bore(s) for cylindrical lock and deadbolt are to be 2-1/8" diameter at 2-3/4" or 2-3/8" backset.

B. Hinges: (3) standard weight radius mortise hinges are required on doors 7'0" height or smaller & (4) on doors greater than 7'0"

1.1 DOOR JAMBS

A. Wood jambs shall be fabricated as a flat jamb with doorstop applied or 2-piece split jamb. Hinge jamb preparations for and 1-3/4" thick doors to be machined to accepts 4" hinges. Strike jamb preparations are to be machined for full lip cylindrical strike plate. Double door units shall include preparations for ball catch located at the top of door on both door panels designed to strike into the head jamb.

PART 3 EXECUTION

1.2 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

1.3 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

1.4 INSTALLATION TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 by 84 inches surface area.
- C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches surface area.
- D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches surface area.

1.5 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

Part 1: GENERAL

1.1 **Scope:** Subject to local building codes, this product is intended for use in:

- 1.1.1 Single family dwelling interior applications.
- 1.1.2 Multifamily dwelling, low-rise professional office, library and low-rise motel interior applications.
- 1.1.3 Lighter use industrial building and factory, hotel, and retail sales building interior applications.

1.2 **Product Description:** 1-3/4" or 1-3/8" side-hinged door systems manufactured by MASONITE.

1.2.1 Door system components include: door panel(s), bifold panel(s), door frame, hinges.

Part 2: BASIC MATERIALS

2.1 **Door Panel:** Masonite® Flush doors shall be fabricated using loose lay up assembly that includes wood veneer or hardboard facings, wood or MDF stiles, wood or MDF rails and corrugated cell core. Door facings are to be bonded to stiles, rails and core forming a 3-ply structural attachment.

2.1.1 Mounting surface for latching hardware to be reinforced with solid internal support. Hinge preparations for 1-3/8" thick doors to be machined for standard weight radius mortise 3-1/2" hinges and 1-3/4" thick doors to be machined to accept 4" hinges. Latch preparations are to be placed in the area of solid internal supports. Face bore(s) for cylindrical lock and deadbolt are to be 2-1/8" diameter at 2-3/4" or 2-3/8" backset.

2.1.2 Vertical edge of door to be square, beveled both sides or lock stile only. Edge preparation should be clearly noted when the product is ordered.

2.2 **Bifold Panel:** Masonite® Flush bifolds shall be fabricated using loose lay up assembly that includes wood veneer or hardboard facings, wood or MDF stiles, wood or MDF rails and corrugated cell core. Bifold facings are to be bonded to stiles, rails and core forming a 3-ply structural attachment.

2.3 **Door Frame:** Wood jambs shall be fabricated as a flat jamb with doorstop applied or 2-piece split jamb. Hinge jamb preparations for 1-3/8" thick doors to be machined for standard weight radius mortise 3-1/2" hinges and 1-3/4" thick doors to be machined to accept 4" hinges. Strike jamb preparations are to be machined for full lip cylindrical strike plate. Double door units shall include preparations for ball catch located at the top of door on both door panels designed to strike into the head jamb.

2.4 **Hinges:** (3) standard weight radius mortise hinges are required on doors 7'0" height or smaller & (4) on doors greater than 7'0".

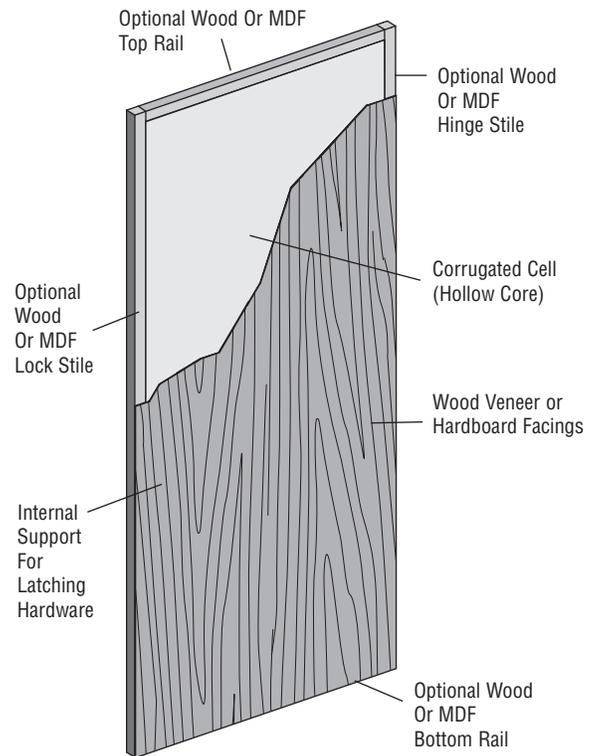
Part 3: DELIVERY, STORAGE & HANDLING

3.1 **Delivery:** Reasonable care shall be exercised during shipping and handling in keeping with the decorative nature of product.

3.2 **Storage & Protection:** Store upright in a dry, well ventilated building or shelter at a constant temperature. Do not store in damp, freshly plastered, drywall or concrete areas until materials have completely dried. Doors should be stored at least 10' away from any heat source to help prevent uneven drying. Doors must be sealed with an oil-based sealer or primer if stored for long periods.

Part 4: EXECUTION

4.1 **Examination:** Site verification of substrate conditions, which have been previously completed, are acceptable for the product installation instructions in accordance with manufacturer's specifications. Verify that door frame openings are constructed plumb, true and level before beginning installation process. Select fasteners of adequate type, number and quality to perform the intended functions.



4.2 **Installation:** Remove protective packaging just prior to installation. Installer shall be experienced in performing work required and shall be specialized in the installation of work similar to that required for this project. Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product packaging instructions for installation.

4.3 **Finishes:** See Masonite - How To Paint and How To Stain instructions for complete finishing details. Various types of materials are used in the construction of the door system; each shall be sealed in accordance with manufacturer's specifications to protect against various environmental conditions. Make sure to completely seal and inspect all 6-surfaces (top, hinge side, bottom, lock side, front face and back face) with two coat minimum on operable panel(s). Finishing and/or re-finishing must be completed immediately after door has acclimated to the environment where it is to be installed and within a maximum of 7 days. Avoid finishing after a rain or damp and during periods of higher than average humidity. Conduct periodic inspections of all coated surfaces to insure that door components are not exposed. Inspections should occur at least once a year. Reseal the surface as needed.

Part 5: GENERAL PERFORMANCE

5.1 **Acoustical Performance:** Unit scheduled for installation in opening requiring a specific noise control rating shall be clearly noted when product is ordered. 1-3/8" thick Flush door with wood veneer facings and corrugated cell core sound transmission class (STC) rating is 24. (See acoustical performance data for unit specific acoustical information.)

Part 6: WARRANTY

6.1 Limited 1-Year - Please check with manufacturer or distributor for current warranty terms and conditions.

SECTION 083113

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Wall access doors.
 - 2. Related hardware.
- B. Related Sections
 - 1. Section 08 70 00 - Hardware.
 - 2. Section 09 21 16 - Gypsum Board Assemblies.
 - 3. Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

- A. UL - Underwriters' Laboratories, Inc.: Fire Hazard Classifications.
- B. ASTM A568 - Steel Sheet, Carbon and High Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For.
- C. ASTM A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- D. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E162 - Test method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data: Manufacturer's standard descriptive literature.
- C. Shop Drawings: Indicate locations, materials, dimensions, product configuration, finish, fire ratings, and attachment to adjacent construction.
- D. Manufacturer's installation instructions.
- E. Submit request for Substitution for access panels attached with tamper proof metal fasteners proposed for use in lieu of hinged ceiling access panels.

1.4 SYSTEM REQUIREMENTS

- A. Access Doors: Provide wall and ceiling access doors as indicated and as required for access to equipment.

- B. Coordinate locations of equipment with access doors of size and type appropriate for the use and location.
- 1.5 MOCK-UP
- A. Provide mock-up of access panel in suspended acoustic ceiling grid in accordance with Division 1.
 - B. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up may remain as part of the Work.
- 1.6 QUALITY ASSURANCE
- A. Manufacturer: Company with minimum 5 years experience in the manufacture of products of the type specified; regularly and presently engaged in product manufacture.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver and store products in manufacturer's standard protective packaging.
 - B. Do not remove protective packaging until ready for installation.
 - C. Follow manufacturer's instructions for storage and handling.
- 1.8 SEQUENCING AND SCHEDULING
- A. Coordinate the Work of this Section with other Sections whose work affects or is affected by the Work of this Section.
 - B. Coordinate the building-in of anchors and similar items.

PART 2 PRODUCTS

- 2.1 WALL ACCESS DOORS
- A. Flush mounted for plaster, gypsum and wallboard partitions.
 - 1. Size: Nominal 16-inches square
 - 2. Material:
 - a. Door: 18-gauge cold rolled steel
 - b. Frame: 2 inch by 2 inch by 3/16 inch steel angle
 - 3. Finish: Factory applied prime coat, field painted
 - 4. Hardware:
 - a. Concealed continuous piano hinge allowing opening to 165 degrees.
 - b. Lock as scheduled.
- 2.2 FABRICATION
- A. Manufacture each access panel assembly as an integral unit ready for installation.
 - B. Welded construction: Furnish with a sufficient quantity of 1/4-inch mounting holes to secure access panels to types of supports indicated.

C. Furnish number of latches required to hold door in flush, smooth plane when closed.

2.3 MANUFACTURERS

- A. Williams Brothers.
- B. Bilco.
- C. Milcor.
- D. Nystrom.

2.4 KEYING

- A. Key as directed by the County Representative.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify rough openings for doors and frames are correctly sized and located for access to items behind frames.
- B. Verify correct placement of built-in frames and accessories.
- C. Verify that conditions are satisfactory for the installation of doors.
- D. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install access doors in accordance with manufacturer's instructions and approved shop drawings.
- B. Secure rigidly in place in accordance with approved shop drawings.
- C. Install frames plumb and level in wall and ceiling openings, parallel to building lines.
- D. Position to provide convenient access to valves, ductwork, and other mechanical and electrical work requiring access as indicated and directed.

3.3 CLEANING, ADJUSTMENTS, AND PROTECTION

- A. Clean and adjust for smooth, even operation.
- B. Protect finished installation.

END OF SECTION

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SECTION 086200

UNIT SKYLIGHTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rigid tunnel skylights.
- B. Related Sections
 - 1. Section 07 60 00 - Flashing and Sheet Metal.

1.2 REFERENCES

- A. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.
- B. ASTM B221 - Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
- C. ASTM C920 - Elastomeric Joint Sealants
- D. ASTM D256 - Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
- E. ASTM D635 - Test method for Determining the Rate of Burning and / or Extent and Time of Burning of Plastics in a Horizontal Position.
- F. ASTM - Test Method for Determining Ignition Temperature of Plastics.
- G. ASTM D2843 - Test Method for Density of Smoke from the Burning or Decomposition of Plastics.
- H. ASTM D4802 - Poly (Methyl Methacrylate) Acrylic Plastic Sheet.
- I. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials.
- J. ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company with minimum 5 years experience in the manufacture of products of the type specified.
- B. Tubular Daylighting Devices General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.

1.4 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Shop Drawings: Indicate materials, finishes, sizes, components, and installation details.
- C. Product Data: Indicate sizes, materials, and finishes.
- D. Warranty: Sample of special warranty.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Uncontrolled water leakage.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - c. Yellowing of acrylic glazing.
 - d. Breakage of polycarbonate glazing.
 - e. Deterioration of insulating-glass hermetic seal.
- B. 2. Warranty Period: years from date of Project completion.

PART 2 PRODUCTS

2.1 SKYLIGHTS

- A. Skylights: Double plastic dome on self-curbing aluminum frame; white translucent outside dome, tinted transparent inner dome with prismatic lens at the ceiling.
- B. Accessories: As required for complete installation.

2.2 MANUFACTURERS

- A. Solatube® 330 DS (Basis of Design)
- B. Velux Sun Tunnel.
- C. Approved Equal

2.3 MATERIALS

- A. Roof Dome: Injection molded polycarbonate classified as CC1 material. Thickness shall not be less than 0.125-inch. Visible light transmission shall be 92-percent or greater. Acrylic dome shall be approved in no-UL applications provided it meets characteristics of Duradome 10 (i.e. DR-101 blend). Roof dome shall contain Raybender Technology, a series of concentric, light refracting etched lines a minimum of 2-inches high to improve light input when sun is low on horizon.

- B. Ceiling Diffuser: Injection molded, acrylic plastic classified as CC2 Plexiglas. Thickness shall not be less than 0.087-inch. Provide special prismatic design to maximize light output.
- C. Roof Flashing: As recommended by skylight manufacturer for roof material and slope.
- D. Main Tube:
 - 1. Fabricate from Aluminum sheet meeting the requirements of ASTM B209, alloy and temper as required by the manufacturer to suit forming operations and finish requirements.
 - 2. Finish- Provide exposed aluminum surface with high polished specular finish meeting AAMA designation M21C31A31. Reflective surface to be Spectralight 2000 or equal. Specular reflectance to be 92-percent and total reflectance to be 95-percent.
- E. Accessories:
 - 1. Ceiling Ring to be 30 percent talc filled polypropylene or high impact ABS.
 - 2. Sealant-Polyurethane or copolymer based elastomeric sealant- use type provided or recommended by the manufacturer.
 - 3. Seals:
 - a. Weather seal- Medium density pile weatherstripping and light density polyvinyl chloride foam tape or UV resistant EPDM rubber.
 - b. Ceiling Diffuser seal- Closed cell polyethylene foam, 3 pounds per cubic foot, and white polyvinyl chloride seal, butt joint welded or EPDM rubber.
 - 4. Fasteners shall be same as metals being fastened or non-magnetic stainless steel or other non-corrosive materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify conditions are satisfactory for the installation of skylights.
- B. Do not begin installation until unsatisfactory conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install skylights in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Completed installation shall be watertight, with all exposed surfaces free from defects and damage.

END OF SECTION

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About Solatube International | Media Resources | Dealership Opportunities

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Residential Commercial

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SolaMaster® Series
Solatube® 330 DS and 750 DS Daylighting Systems

Redefine Daylighting. Redefine Performance.

Expansive spaces require extraordinary amounts of natural light so we designed the SolaMaster Series to provide two exceptional choices for daylighting design. The Solatube 330 DS Daylighting System offers a high-performance daylighting experience that maximizes mid-day sunlight. The 750 DS is designed to create a more consistent daylighting experience that extends the day and enhances visual comfort.



Solatube® 330 DS **Solatube® 750 DS**

Product Specifications

Tube Size (Diameter)

≈ 21 in
(530 mm)

≈ 21 in
(530 mm)

Product Options

Closed Ceiling Diffusers



OptiView® Diffuser

The innovative design of our OptiView Diffuser delivers the cleanest, purest natural daylight imaginable. A matrix of individual Fresnel lenses offers a unique view of the sky above and also provides unrivaled and highly engineered diffusion.



Prismatic Diffuser

Ideal for replicating the look and style of traditional troffers, the Prismatic Diffuser option blends into virtually any design to provide a bright, broad diffusion of natural light.



Open Ceiling Diffusers



White Trim with OptiView® Diffuser

The innovative design of our Open Ceiling OptiView Diffuser delivers the cleanest, purest natural daylight imaginable. The Open Ceiling diffuser creates the perfect finishing touch to open ceiling applications by easily snapping on to bottom tube.



White Trim with Prismatic Diffuser

Designed to blend into any design by replicating the look and style of traditional lighting fixtures. The Open Ceiling diffuser creates the perfect finishing touch to open ceiling applications by easily snapping on to bottom tube.



Flashings

A full selection of durable flashings ensures leak-proof, hassle-free installations on virtually any roof type and pitch. The Solatube® self mounted flashings eliminate the need for expensive curbs and can be integrated into the roofing system for a worry-free installation



Self Mounted

- Available in 4 in/100 mm, 8 in/200 mm and 11 in/280 mm height flashing options, used on pitched or flat roof systems.
- The 4 in/100 mm high flashing is recommended for most residential applications because of its low profile.



Built-up



- The 8 in/200 mm and 11 in/280 mm high flashings are recommended for use on flat commercial roof applications to meet commercial curb height requirements



Metal Roof Flashing

- 2-piece streamlined design eliminates the need for expensive curbs and bulky crickets
- Innovative DryLock Technique provides a triple-seal that virtually locks the flashing to the roof deck
- Easily adapted to fit nearly any Universal Standing Seam Rib (SSR) roof profile
- [Click here](#) for more information



Metal Roof Flashing



Curb Mounted Cap

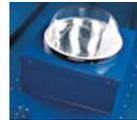
- Use on pitched or flat roof with any roof materials and with-pre built wood or manufactured metal curb.



Membrane



Built-up



Metal



Tile



Accessories



Daylight Dimmer™

Because you don't need 100% of the light 100% of the time, the innovative Solatube Daylight Dimmer easily controls the amount of daylight entering a room with the convenience of a switch. Our patented variable butterfly baffle controls the light output. Accepts power supplies ranging from 90 to 277 volts AC.



Double-Pole Double-Throw (DPDT)

Works with our Daylight Dimmer switch (sold separately) to provide an easy-to-use daylight control solution.



Secondary Diffuser

To eliminate unwanted glare or to reduce light output, an optional secondary diffuser can be inserted into the Solatube® Daylighting System dome for natural lighting preference.



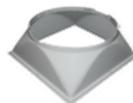
Spectralight® Infinity Extension Tubes

Extension tubes can be added in increments of 24 in/610 mm or 48 in/1220 mm for long runs without sacrificing performance. Spectralight Infinity has the highest reflectivity in the world for the brightest, purest light. Create tube runs of up to 50 ft/15 m.



Flashing Turret Extensions

Use to raise the height of the Solatube dome on a roof to avoid snow, water, or shading from roof obstructions. Order additional Spectralight® Infinity tubing to accommodate turret height. Available in 12 in/300 mm, 24 in/610 mm, 36 in/900 mm and 48 in/1220 mm sizes.



Transition Box

The SolaMaster® Series features a patented transition box that seamlessly converts the round tubing to a square diffuser. The transition box easily fits into standard commercial ceiling grids.



	<p>Flashing Insulator This insulating material helps to reduce flashing condensation in cold climates when the flashing is exposed to a humid interior space. The insulator is affixed to the flashing base and the top tube slips through the opening, which provides a seal between the interior and metal flashing.</p>	<p>■</p>	<p>■</p>
	<p>Trim Ring For use with the Solatube 330 DS and 750 DS Open Ceiling Configurations, the trim ring provides a finished appearance to the installation.</p>	<p>■</p>	<p>■</p>
	<p>Daylight Dimmer™ Switch Daylight Dimmer Switch Kit includes DPDT switch, wall plate and 15 ft/4.5 m of cable. Multiple Daylight Dimmers can be controlled by one switch.</p>	<p>■</p>	<p>■</p>
	<p>Security Bar This stainless steel bar inserts into the flashing turret across the diameter of the opening. The bar is fastened using rivets and prohibits entry through the dome.</p>	<p>■</p>	<p>■</p>
	<p>Dome Security Kit The kit consists of six rivets with protective nylon spacers, which replace dome screws. The dome security kit reduces the possibility of the dome being removed.</p>	<p>■</p>	<p>■</p>
	<p>Wire Suspension Kit Use the wire suspension kit when additional bracing to the structure is required.</p>	<p>■</p>	<p>■</p>
	<p>Dome Edge Protection Band Required for Class A, B or C fire roof rating.</p>	<p>■</p>	<p>■</p>

Solatube International, Inc.
2210 Oak Ridge Way | Vista, CA 92081-8341 |
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SECTION 086400

VINYL WINDOWS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope: Furnish and install vinyl frame windows with dual-pane insulating units and accessories as shown on Drawings and specified herein.
- B. Related Work Specified Elsewhere
 - 1. Section 06 10 00: Rough Carpentry
 - 2. Section 07 92 00: Sealants and Caulking
 - 3. Section 09 25 00: Gypsum Wallboard

1.2 QUALITY ASSURANCE

- A. AAMA Publication 101V-86 for types of windows specified.

1.3 SUBMITTAL

- A. Manufacturer's Data: Manufacturer's data consists of specifications and engineering data printed and provided by the manufacturer of the specified item and provide complete descriptive information.
- B. Manufacturer's Written Instructions: Manufacturer's written instructions shall consist of data printed and provided by the item manufacturer which provide installation and maintenance information of the product specified herein.
- C. Shop Drawings:
 - 1. Drawings shall show elevations of units, full size sections, thicknesses of metal, reinforcing, fastenings, methods of installation and anchorage, size and spacing of anchors, method of glazing, locations of hardware, mullion details, method and material for weatherstripping, details of installations, connections with other work and window schedule showing locations.
 - 2. Shop Drawing shall incorporate both window and window actuator (at locations shown on Drawings).
- D. Samples: 12" long section of extrusion in specified finish.
- E. Certificate of Compliance: AAMA label certifying performance of window for rate of air infiltration (per ASTM E283), water resistance (per ASTM E547) and structural performance (per ASTM E330) as indicated in AAMA publication 101V-86.
- F. Submittals shall clearly identify any variations from Contract Documents.

1.4 PRODUCT STORAGE

- A. Materials shall be stored out of contact with ground and under weathertight cover.

1.5 WARRANTY

- A. Commercial Special Warranty:

1. 10-year guarantee.
2. Guarantee windows against defects in manufacturing and workmanship including costs for parts and labor.

PART 2 PRODUCTS

2.1 GENERAL, WINDOWS

- A. Air Infiltration: No more than 0.15 cfm per square foot of overall frame area at an inward test pressure of 1.57 psf.
- B. Water Penetration: No water penetration as defined in test method at an inward test pressure of 3.0 psf.
- C. Structural Performance: No glass breakage, damage to hardware, permanent deformation that impairs operation of window, or residual deflection at a positive (inward) and negative (outward) test pressure of 37.5 psf.
- D. Material: Extruded, high impact resistant, rigid polyvinyl chloride (PVC).
- E. Welds: Dressed and finished to match surround frame area.
- F. Finish
 1. Color shall be solid (homogeneous) frame color.
 2. Colors shall be as selected by Owner's Representative from manufacturer's standard color range.
- G. Weatherstripping
 1. All operable sash members shall be double weatherstripped with extruded EPDM.
 2. Weatherstripping shall be replaceable without the use of special tools.
- H. Hardware: Manufacturer's standard hardware fabricated from non-corrosive material.
- I. Glazing
 1. Glass: Clear insulating glass units, argon gas filled with low-E coating pyrolytic on second surface or sputtered on second or third surface.
- J. Glazing Stops
 1. Screw applied or snap-on glazing stops (beads) coordinated with glass section.
 2. Finish glazing stops to match exterior window finish.
- K. Insect Screens
 1. Aluminum tubular frame screens: Comply with SMA 1004, Architectural C-24 class.
 2. Fabricate frames with mitered or coped corner extrusions, concealed fasteners and removable PVC spline/Anchor concealing edge of frame.

2.2 WINDOW MANUFACTURER

- A. Manufacturer
 1. Milgard Windows, Milgard Vinyl Windows

2. Pella Corporation
3. Marvin Windows

2.3 WINDOWS

- A. Milgard "Tuscany Series" (basis of design)
 1. Radius Window Series, 1 inch nail fin setback with stucco key:
 - a. Frame: Minimum 3-1/4 inch (83 mm) deep, multi-chambered vinyl profile.
 - b. Sash: Minimum 2-15/16-inches deep, multi-chambered vinyl profile.
 2. Performance Class:
 - a. 36"x72": 8330T Series.
 3. Single-hung series.

PART 3 EXECUTION

3.1 GENERAL

- A. Field verify dimensions prior to fabrication.
- B. Determine locations and provide tempered glass where required.

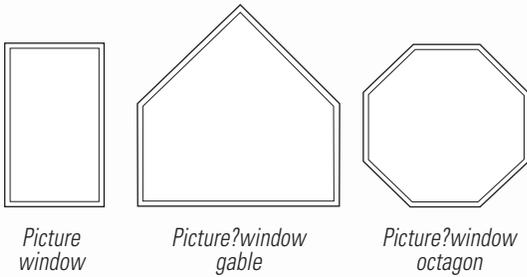
3.2 INSTALLATION

- A. Install windows in accordance with Shop Drawings. Ensure assemblies are plumb, level, and free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- B. Use sufficient anchorage devices to securely and rigidly fasten door and frame assemblies to building.
- C. Install perimeter sealant and related backing materials in accordance with workmanship and installation requirements indicated in Section 07920.

END OF SECTION

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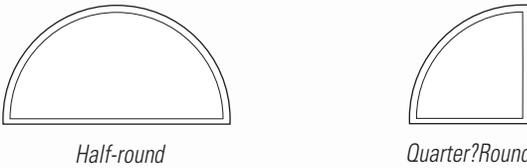
Picture/Radius Windows Tuscany™ Vinyl Replacement Window



Picture window

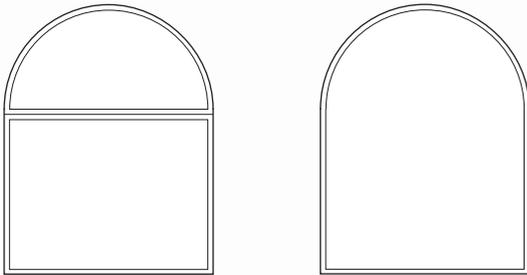
Picture?window gable

Picture?window octagon



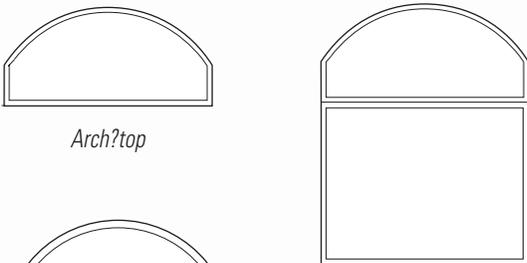
Half-round

Quarter?Round



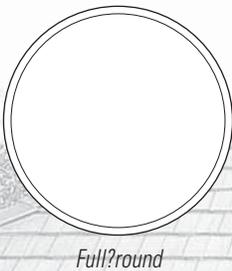
Round?top/picture

Round?top



Arch?top

Arch?top/picture



Full?round

— PICTURE WINDOW

- Min 1'6" Max 8'6"

— OCTAGON

- Min 2'2" Max 6'6"

— HALF ROUNDS

- Min 2'1" Max 8'4"

— QUARTER ROUNDS

- Min 1'3" Max 5'5"

— FULL ROUND

- Min 2'2" Max 5'5"

— ARCH TOPS

- 48 square feet maximum
- Min 2'2" Max 8'6"
- must specify leg height and center height (minimum 6" leg height)

NOTE: For engineering approval contact your Milgard representative for any configuration over 40 square feet. Each Milgard Manufacturing plant reserves the right to alter or change sizes and configurations according to location capabilities. Ask your Milgard rep about specialty applications.

Windows over 40 square feet shipped open for field glazing. Varies by location.

Picture/Radius Windows Tuscany™ Vinyl Replacement Window



Tuscany is designed for replacement applications and it is available in multiple frame styles including nail-on fin frame, the series is appropriate for new construction.

The Tuscany series vinyl Picture/Radius window offers the outstanding insulating properties, low maintenance, and contemporary aesthetic appeal only vinyl can provide. Available in white or tan homogenous window frames, Tuscany's durable vinyl exterior will never need painting. The windows will maintain their color and shape and can be constructed to your exact size specifications, subject to engineering review. All Milgard windows are made to order at no additional charge.

Like all Milgard windows, patio doors and skylights, the Tuscany series has a Full Lifetime Warranty to the original single family homeowner covering both materials and labor. The Tuscany series also carries a lifetime glass breakage warranty. The Milgard Full Lifetime Warranty is fully transferable unlimited up to 10 years. For more information, locate our simple one-page warranty on milgard.com.

Commercial, apartment, multi-family, and co-housing projects are covered by a 10-year warranty from date of manufacture, covering all materials and labor, including the glazing unit.

Picture/Radius Windows Tuscany™ Vinyl Replacement Window

CONFIGURATIONS

Milgard's Tuscany Series Picture Windows can be combined with each other or other Milgard vinyl windows to create almost any configuration you can envision. Milgard Picture Windows are available in custom sizes to match almost any design.

All windows over 40 square feet (location specific) are shipped open (may require multi-lite) and will require field glazing.

Milgard's Tuscany Series Radius Windows can be combined with each other or other Milgard vinyl windows to create almost any configuration you can envision. Milgard Picture Windows are available in round tops, half rounds, quarter rounds and full rounds in custom sizes to match any design.

COMPONENTS

FRAME

Tuscany is available in a variety of frame and trim choices. The 3-1/4" deep nail on frame is ideal for both New Construction and Replacement installations. We offer a standard nail fin frame for New Construction, a Block frame with no fins for insert Replacement and two different Z bar flange options, welded into the frame, for stucco exterior Replacement applications. Frame components are made of a high performance uPVC, rigid polyvinyl chloride material, custom compounded for superior impact resistance, color retention and weather resistance. The frame and sash corners are all precision mitered and fusion welded for a lifetime of air and water resistance.

The Tuscany product line meets or exceeds the AAMA/WDMA/CSA 101/I.S.2/A 440-05 Industry Specification for Windows and Doors. They are also tested for Forced Entry Resistance to the ASTM F588-97 standard, Grade 20 level. Each window is labeled with the NFRC Energy Star performance information, based on the type of glazing you select.

AVAILABLE FRAME STYLES*

NO NAIL-ON FIN

(TUSCANY HORIZONTAL SLIDING WINDOW FRAME):

8320T	Block Frame
8370T	1-5/8" Narrow Z-Bar
8340T	2-1/8" Wide Z-Bar

INCLUDES NAIL-ON FIN:

8320T	1-3/8" Nail Fin Setback
8330T	1" Nail Fin Setback with Stucco Key
8340T	1-3/8" Nail Fin Setback, 2" Long Nail Fin
8340T	1-3/8" Nail Fin Setback, 2" Long Nail Fin with Optional: 3/4" Flat J-Channel 1" Contoured J-Channel 2" Brickmold-style J-Channel

**Not all frame styles available at all Milgard locations.
Contact your sales representative for more information.*

BLOCK FRAME

The block frame style is a window frame profile without a nail fin. The block frame allows an installer to insert the replacement window into the existing frame, without disturbing the home's internal or external wall surfaces. Installation method includes carefully drilling through the jamb.

Z-BAR (STANDARD AND WIDE)

Two extruded Z-bar frame choices are available with Tuscany™ series, standard (1-5/8") and wide (2-1/8"). Z-bar installation, the method of removing the aluminum or steel sash but leaving the frame in place, is ideal with aluminum retrofit in stucco applications and can save a significant amount on installation costs.

NAIL-ON FIN

(1-1/4" OR 2" FIN WIDTHS AVAILABLE)

A pre-punched nail flange extends around the perimeter frame, securing the window in rough openings and acting as a part of the flashing system.

FIN SETBACKS ARE AVAILABLE IN:

- 1-3/8" nail fin setback (1-1/4" or 2" pre-punched nail flange)
- 1" nail fin setback with stucco key (1-1/4" pre-punched nail flange)

The 2" pre-punched nail flange frame also has an exterior accessory groove which allows for optional J-channel trim:

- 2" Brickmold
- 1" Contour
- 3/4" Flat

The 2" brickmold is applied in the field on the window, and snapped in-place after window installation. The 1" contour and 3/4" flat J-Channel options are welded in place at the factory. All trim options are extruded by Milgard and are available in white and tan.

WEEP SYSTEM

Hollow sill construction and offset weep baffles release any accumulated moisture from the sill pockets and help prevent blow back, and helps control the water flow caused by a combination of wind and rain.

GLAZING MATERIAL

AAMA-approved glazing tape adheres glass to the fixed and vent panel frames which seals and cushions the glass. Rigid vinyl setting blocks are used to support the unit above the sill, preventing glass shear (glass in the insulated unit becomes offset). Extruded vinyl glazing (snap-in) bead is applied around the interior edge.

"Interior glazing" makes replacement of glazing unit convenient;

Picture/Radius Windows Tuscany™ Vinyl Replacement Window

bead is mitered at 45 degree for a finished look. Insulating dual glazed panes has a 7/8" overall glass thickness, are dual seal equivalent, sealed for optimal energy efficiency. All Tuscany™ windows currently meet or exceed EnergyStar® performance in all climate zones with a 0.35 u-factor or lower. Specialty glass options are available upon request which can help achieve as much as a 26% improvement in u-factor.

Specialty glass options for privacy, noise abatement and aesthetics are available upon request.

SCREEN

Milgard's exclusive PureView™ screen frames are cambered aluminum, assembled with rigid nylon corner clips. Rolled pull rail provides simple installation and removal. Screens come standard with matching frame color. PureView's innovative screen uses smaller diameter yarn, improving the interior view. The finer mesh also reduces the appearance of a screen, enhancing curb appeal. PureView's fiberglass charcoal screen mesh is strong, durable and easy to replace. All screens are under one year warranty.

ENERGY PACKAGES

Milgard offers two energy efficiency upgrade packages that offer increased U-Value performance. 3D™ and 3D MAX™ use the ENERGY STAR® criteria from each climate zone and utilize materials that are tailored to each individual climate to increase energy efficiency. The combination of the frame material, product design and glazing unit make up the 3 components of the energy packages. The Tuscany Series receives up to 23% increase in energy efficiency with the 3D MAX package.

Note:

- Packages available in most markets. Please see your local sales representative for details.
- 3D and 3D MAX energy packages are based on insulated glass units with Single Strength (3/32") and Double Strength (1/8") glass. Some glass thicknesses and internal grid combinations may result in lower energy performance.
- 3D and 3D MAX energy packages are not included with the 8125 Double Slider, 5621WS Wide Stile Sliding Door, 8225 Double Hung when selecting grids and are currently not available in breather tube applications.

OPTIONS

GRIDS

Available in 5/8" flat or 1-1/16" sculptured aluminum profiles. Color-matched to frame. Simulated divided lite (SDL) grids are also available in some locations, using 5/8" grids between the glass panes for three-dimensional shadowing as well as 7/8" contoured vinyl grid applied to the interior and exterior glass panes.

All grids are color matched to frame in white or tan.

GLASS

Full Lifetime Glass Breakage Warranty. For complete warranty details visit milgard.com.

TEST STANDARDS

See Test Reports/Energy Ratings section.

Caution: The use of petroleum based fuels or solvents as release agents in stucco wall installations or glass cleaning will chemically attack materials used in seals and other components, and voids the Milgard Warranty. The use of wax based release agents is recommended.

Expanding foam for insulation purposes should not be used. Backer rod or loose packed fiberglass bat insulation is recommended.

SECTION 087000

FINISH HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Hardware for integrated wood doors and frames.
 - 2. Thresholds.
 - 3. Gasketing.
 - 4. Related accessories and components.
- B. Related Documents and Sections
 - 1. Section 08 17 13 – Integrated Wood Doors.

1.2 REFERENCES

- A. ANSI A117.1 – Guidelines for Accessible and Useable Buildings and Facilities.
- B. ANSI A156.13 - Interconnected Locks and Latches.
- C. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- D. BHMA - Builders' Hardware Manufacturers Association.
- E. CCR - California Code of Regulations.
- F. NFPA 80 – Standard for Fire Doors and Other Opening Protectives.
- G. NAAMM - National Association of Architectural Metal Manufacturers.
- H. SDI - Steel Door Institute.
- I. UL - Underwriters' Laboratories, Inc.

1.3 COORDINATION

- A. Coordinate work of this Section with other affected Sections involving manufacturer of internal reinforcement for door hardware.
- B. Coordinate installation with finishing operations.

1.4 QUALITY ASSURANCE

- A. Finish Designations and Standards: BHMA Standard 130.
- B. Spare Parts: Stock in California.

1.5 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Indicate locations and mounting heights of each type of hardware.
- C. Product Data: Include data for all hardware items.
- D. Shop Drawing Hardware Schedule.
- E. Notice of Discrepancy: Within 20 days of Notice to Proceed, submit notification that quantities of hardware items indicated to be furnished are of the correct type and quantity required to complete the work of this Section. If type and quantity are not correct, indicate variations.
- F. Samples: When substitutions are proposed, submit samples of both specified item and proposed item for comparison.
- G. Operating and Maintenance Data: Include data on operating hardware, lubrication requirements, inspection procedures related to preventative maintenance, parts catalog, and keying records.
- H. Submit manufacturer's certificate that products meet or exceed specified requirements, and bear UL label where required.
- I. Submit sample of each lock and lock function without operators.
- J. Manufacturer's installation instructions.
 - 1. Include instructions for handling, storage, and protection of each product.
- K. Tag or package each item. Indicate for each item:
 - 1. Building and door number as shown on Drawings.
 - 2. Hardware size, handing, and type.
 - 3. Template.
- L. Keys
 - 1. Arrange shipment of permanent keys, construction keys, and two extractor keys in crates of individual packets direct from lock manufacturer to County's Representative by registered mail.
 - 2. Identify each packet with key number.
 - 3. County's Representative will be responsible for key issue during construction.
- M. Protect finishes by temporary coverings as required.

1.6 SEQUENCING, SCHEDULING, AND COORDINATION

- A. Where items specified under this Section are to be built into work specified under other Sections provide those items to such other Sections in a timely fashion to avoid delay of work. Coordinate placement; verify accurate locations and correct installations.

1.7 WARRANTY

- A. Provide a three year warranty under provisions of Division 1.
- B. Warranty: By material manufacturer, installer, and Contractor, jointly and severally, and signed by officers of each company.

1.8 SPARE PARTS

- A. Provide hardware, including spares, required by hardware schedule on Drawings.
- B. Furnish 1 set of lock tools.
- C. Deliver spare parts and lock tools, boxed and identified, to County's Representative.

PART 2 PRODUCTS

2.1 MORTISE LOCKSETS AND LATCHSETS

- A. Protected Mortise Lock Mechanism
 - 1. Mortise Lock Manufacturers:
 - a. Schlage Lock Co.; D70PD-03 Series, with Lever Handle Protection Device.
 - 2. Description: ANSI A156.2, Grade 1, mortise with antifriction latchbolt with 1-inch throw and 2-3/4-inch backset. Provide with strikes appropriate to location and function.
 - 3. Cylinders
 - a. Manufacturer's standard cylinder body with cylinder plug removable only by removal of cylinder body from lock case.
 - b. Cylinder Plug: Open at rear to allow clearing of obstructions.
 - c. Key Cutting, Cylinder Maintenance, Rekeying: Possible using industry standard equipment. Cylinders requiring manufacturer-specific equipment will not be accepted.
 - d. Interchangeable cores removable by use of special change key will not be accepted.
 - 4. Handles:
 - a. Solid stainless steel levers, circular in cross section, 2 inch minimum clearance between inside of handle at midpoint and mounting surface, return to within 1/2 inch of door face.
 - b. Manufacturers:
 - 1) Schlage Model 03 or equal.

2.2 LOCK PROTECTORS

- A. Manufacturers:
 - 1. Pull-Push Plates: 8200
 - a. Glynn-Johnson; Finish US32D

2.3 DOOR HOLDERS

- A. Holder Down Type-555
 - 1. Manufacturers:
 - a. Glynn-Johnson; Model 455H SPBLK.
 - b. Substitutions per Division 1.

2.4 DOOR STOPS

- A. Stop - Wall Stop (Interior Use)

1. Manufacturers:
 - a. Hager, Model 255S.
 - b. Glynn-Johnson, Model FB-18S.
 - c. Trimco, 1209 KC.

2.5 FASTENERS AND ADHESIVES

A. Fasteners

1. Exposed Screws, Bolts, Nuts: ASTM A307 Grade A.
2. Screw Thread Adhesive Sealant.
3. Exposed screws shall match hardware finish or, if exposed in surfaces of other work, match finish of other work.
4. Manufacture hardware to conform to template.
5. Through bolt surface mounted closers.
6. Provide non-corrosive fasteners.

B. Adhesives

1. Epoxy; minimum 2300 psi.
2. Manufacturer and Product:
 - a. Hilti; C100.

2.6 MANUFACTURED UNITS

- A. Provide hardware for fire rated openings in compliance with UL and NFPA 80.
- B. Furnish items of hardware for proper door swing.
- C. On doors that might prove dangerous to visually impaired persons, provide knurling on knobs or lever handles. Doors include, but are not limited to, doors to mechanical rooms, electrical closets, loading platforms or stairs.

2.7 FINISHES

- A. Provide US32D/BHMA 630 finish on all hardware, unless otherwise indicated.

2.8 KEYING

- A. Keying Schedule will be provided by County's Representative after Shop Drawing Hardware Schedule has been approved.
- B. Provide for up to 6 cut keys plus one blank key per lock. Do not cut keys prior to receipt of keying schedule. Final quantities of each key will be determined by the keying schedule.
- C. Keys shall be delivered to County's Representative, who will be responsible for key issue during construction.
- D. Keys shall be engraved with up to 5-digit identification as directed by County's Representative. No other identifying characters shall appear on key.
- E. Provide and set up complete visible card indexed system with key tags and control slips.
- F. Construction Keying
 1. Furnish split key construction master keying with four construction master keys.

2. Upon completion of any portion of Project and when directed by the County's Representative, Contractor shall extract split key inserts in the presence of County's Representative and determine that permanent keys operate their respective locks.
3. After permanent key is tested, return keys in packets to County for storage.
4. Turn split key inserts and extractor keys over to County for future use.

2.9 KEY CABINET

- A. Manufacturer and Model:
 1. Telkee, Inc.; Aristocrat AWC 350S.
 2. Substitutions under provisions of Division 1.
- B. Cabinet: BHMA 156.5. Sheet steel construction, piano hinged door with lock master keyed to building system.
 1. Size for project keys plus 10 percent growth.
 2. Finish: Baked enamel, color as selected from manufacturer's standards.
- C. Accessories:
 1. Horizontal metal strips for key hook labeling with clear plastic strip cover over labels.
 2. Key cabinet index, dual books, tags, fasteners, and other standard accessories for complete key control system.
- D. Accessories:
 1. Recessed mounting kit for recessed vaults.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Use the templates provided by hardware item manufacturer.
- B. Protect hardware from final painting and finishing operations.
- C. Permanently install hardware after finishing operations are complete.
- D. Unless otherwise indicated:
 1. Use SDI mounting heights for hardware; comply with CCR, Title 24, Part 2, Section 1133B.2.5.1 for hand activated locking and latching devices.
 2. On pairs of doors, active leaf shall be right side as viewed from keyed side of doors.

3.2 ADJUST AND CLEAN

- A. Adjust doors for smooth and balanced movement through full swing (170 degrees).
 1. Maximum effort to manually operate interior and exterior doors shall not exceed 5-pounds; such pull or push effort being applied at right angles to hinged doors, and at the center plane of sliding doors with all hardware installed.
 2. The maximum effort required to operate fire rated doors may be increased to a maximum of 15 pounds when required by the Authority Having Jurisdiction.
 3. Adjust door closers so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3-inches from the latch. There shall be no abrupt change of speed between "sweep" and "latch" speeds.
- B. Adjust and check each operating item of hardware to ensure proper operation or function.
 1. Lubricate moving parts with lubricant recommended by manufacturer.

2. Replace units that cannot be adjusted and lubricated to operate smoothly.
- C. When hardware is installed more than one month prior to final acceptance, during week prior to acceptance, check and adjust of all hardware items.

3.3 DEMONSTRATION

- A. Instruct County's personnel under provisions of Division 1.
- B. Provide instruction for 5 people.
- C. Duration: 2 working days.
- D. Provide instruction pertaining to:
 1. Operating and maintenance procedures.
 2. Key control system.

3.4 HARDWARE SCHEDULE

- A. Hardware schedule in the drawing.

END OF SECTION

1000000000

CROSS SECTION DRAWING

FIBERGLASS OUTSWING ADA COMPLIANT 1/2" SILL PATIO DOOR

200 File Scale: 1" = 1/2" Full Size

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Date: 10/20/2000

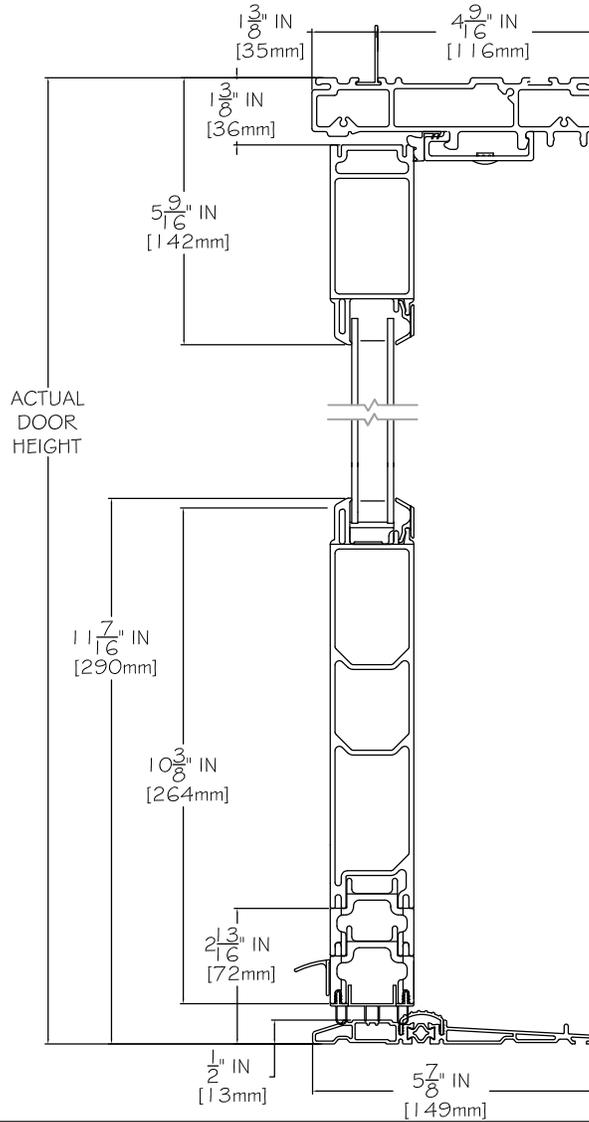
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Project: [Name]

VIEW: VERTICAL

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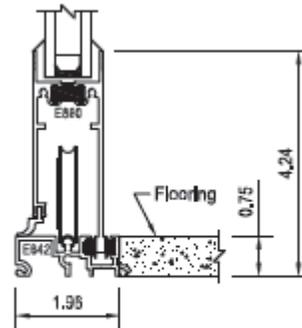
enigma.com



Door Sill Options

Flush Sill

- The Flush Sill is ideal for conditions in which ease of entry is more important than weather performance.
- The interior and exterior height of the sill is only .75" and can flush out with most interior flooring.



flush sill
with 1.81" Rollers



27P

Product Information

Note: - ADA Compliant
- Not available for BTB mounting

Flush Cup Pull



Product Specifications

- Face:** - 5" x 5" (127 mm x 127 mm)
- Projection:** - 3/8" (10 mm)
- Opening:** - 3" X 3-1/2" (76 mm x 89 mm)
- Cup clearance:** - 7/8" (22 mm)
- Material:** - Stainless Steel
- Finish:** - US32D
- Fasteners:** - Four (4) 1/4-20 x 3/4" undercut FPHMS (security torx)
- Certification:** - Meets ANSI A156.6 for J403 pulls



Cross Section Drawing

THREE PANEL ALUMINUM STACKING DOOR FLUSH SILL, NO SCREEN



Clearly the best.™

CAD File Scale
NTS

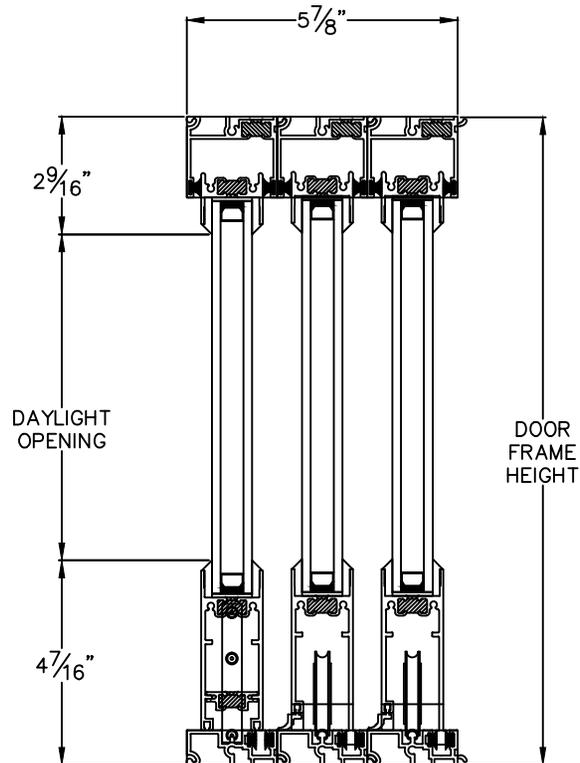
View
Horizontal & Vertical

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W600 SERIES

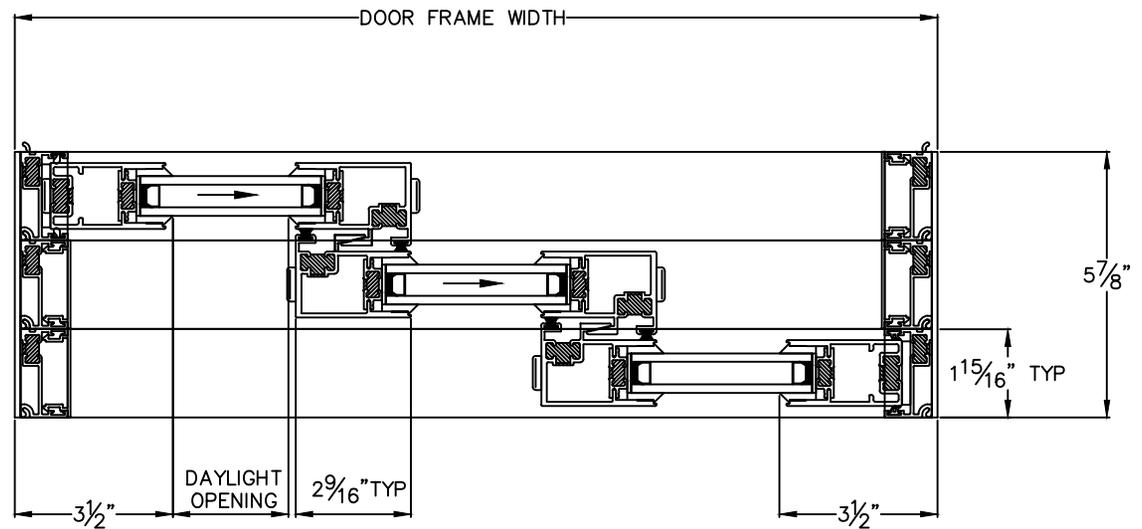
Units
Inch

More Technical Documents can be found at milgard.com/professionals

Due to continual research and development, details may be changed at any time. ©2013 Milgard Mfg.



HEAD & SILL



JAMBS

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Gypsum board.
 - 2. Abuse-resistant backing board for use in secure areas in toilet rooms, with tile cover.
 - 3. Duct enclosure board.
 - 4. Wallboard accessories.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 07 90 00 - Joint Protection.
 - 3. Section 08 31 13 - Access Doors and Frames.
 - 4. Section 09 22 00 - Supports for Plaster and Gypsum Board.
 - 5. Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

- A. ASTM A653 - Sheet Steel Galvanized or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM C36 - Gypsum Wallboard.
- C. ASTM C423 - Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- D. ASTM C475 - Joint Compound and Joint Tape for Finishing Gypsum Board.
- E. ASTM C630 - Water-Resistant Gypsum Backing Board.
- F. ASTM C840 - Application and Finishing of Gypsum Board.
- G. ASTM C954 - Steel Drill Screws for the Application of Gypsum Board or Metal to Steel Studs from 0.033 inches to 0.112 inches in Thickness.
- H. ASTM C1002 - Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- I. ASTM C1047 - Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- J. ASTM C1177 - Glass Mat Gypsum Substrate for Use as Sheathing.
- K. ASTM C1178 - Glass Mat Water-Resistant Gypsum Backing Panel.
- L. ASTM C1278 - Fiber-Reinforced Gypsum Panel.

- M. ASTM C1396 - Gypsum Board.
- N. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- O. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- P. ASTM E90 - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- Q. ASTM E119 - Test Methods for Fire Tests of Building Construction and Materials.
- R. ASTM E413 - Classification for Rating Sound Insulation.
- S. Gypsum Association Fire Resistance Design Manual.
- T. GA-223 - Gypsum Panel Products Types, Uses, Sizes, and Standards.
- U. GA-216 - Application and Finishing of Gypsum Panel Products (19th Edition).
- V. GA-239 - Water Resistant Gypsum Backing Board for Ceramic Tile in Wet Areas.

1.3 QUALITY ASSURANCE

- A. Manufacture: Gypsum wallboard, including accessories and fasteners, shall be the products of the same manufacturer.

1.4 REGULATORY REQUIREMENTS

- A. Comply with fire-resistance ratings indicated on the Contract Documents.
- B. Materials, accessories, and application procedures shall be listed by UL or tested in accordance with ASTM E119 for the type of construction indicated.
- C. The Work shall comply with the applicable requirements of ASTM C840.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Data: Indicate materials, sizes, fire ratings, and other applicable data.
 1. [For credits MR4.1 and MR4.2] For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content, the manufacturer, and the source of the recycled content data.
 2. [For Credit EQ 4.1] For adhesives used to laminate gypsum board panels to substrates include printed statement of VOC content.
- C. Submit manufacturer's certification that materials comply with the requirements of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery

1. Deliver materials to the Project site with manufacturer's labels intact and legible.
2. Deliver fire-rated materials bearing the testing agency's label and classification identification.

B. Storage

1. Store materials indoors in a dry area, under cover, and stacked flat, off the floor.
2. Stack wallboard so that long lengths are not over short lengths.
3. Store flammable adhesives away from fire, sparks or smoking areas.

C. Handle wallboard in a manner to avoid damaging face and edges of sheets.

1.7 PROJECT CONDITIONS

A. Maintain temperature range between 55 and 70 degrees F for 24 hours before, during, and after gypsum wallboard and joint treatment applications.

B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

C. Ventilation

1. Provide ventilation during and following adhesive and joint treatment applications.
2. Use temporary air circulators in enclosed areas lacking natural ventilation.
3. Under slow drying conditions, allow additional drying time between coats of joint treatment.
4. Protect installed materials from drafts during hot and dry weather.

D. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

E. Do not install interior products until installation areas are enclosed and conditioned.

PART 2 PRODUCTS

2.1 PANELS, GENERAL

A. A. Recycled Content: Provide gypsum panel products with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 50 percent by weight.

2.2 MANUFACTURERS

A. Gypsum Wall Board Products and Accessories: Listed products establish standard of quality and shall be manufactured by a single manufacturer from the following:

1. Georgia-Pacific Gypsum, LLC, Gypsum Wallboard Products (GP).

2. United States Gypsum Co. (USG)

2.3 GYPSUM BOARD

- A. Fire Rated: Type 'X'; 5/8 inch thick unless otherwise indicated on the Contract Documents.
 1. Manufacturers
 - a. Georgia Pacific
 - b. USG
- B. Water-Resistant Board: ASTM C1396; tapered and wrapped long edges.
 1. Provide on walls at exposed and concealed locations at toilet rooms, janitor rooms, kitchens, and other "wet" spaces indicated.
 2. Provide 1/2-inch units where it abuts above or adjacent to cementitious backer board.
 3. Manufacturers
 - a. Georgia Pacific
 - b. USG

2.4 WALLBOARD ACCESSORIES

- A. General: Wallboard accessories shall be from the same manufacturer as the wallboard system used.
- B. Fasteners
 1. General:
 - a. ASTM C954 for fastening to 20 gauge and thicker supporting metal.
 - b. ASTM C1002 for connection to 22 gauge and thinner metal.
 - c. Type G or W Screws with corrosion-resistant coating for attachment to wood.
 2. Lengths
 - a. Sufficient for point penetration through supporting metal framing of not less than 1/4-inch or more than 1/2-inch.
 - b. Sufficient for minimum 3/4-inch penetration into wood studs.
- C. Metal Trim
 1. Corner Bead: Fine mesh expanded steel wing type, zinc coated in conformance with ASTM A653, G90 coating designation.
 2. Control Joint: Steel, perforated flange wing type, with single bead, zinc coated in conformance with ASTM A653, G90 coating designation.
 3. Edge Trim: Steel, of configuration and size dictated by Project conditions, zinc coated in conformance with ASTM A653, G90 coating designation.
- D. Joint Treatment Materials: In conformance with ASTM C475.
 1. Joint Tape: Perforated.
 2. Joint Compounds: Ready mixed, regular and water resistant types, recommended by wallboard manufacturer.
 3. Prefill Joint Compound: Powdered.
- E. Miscellaneous Items: Furnish components not specified herein but indicated and required for a complete installation.
 1. Laminating Adhesive: Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Acoustical Sealant: Provide sealants that have a VOC content of [250] <Insert limit> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the installation of gypsum wallboard and associated accessories:
 - 1. Check framing for accurate spacing and alignment.
 - 2. Verify that spacing of installed framing does not exceed maximum allowable for thickness of wallboard to be used.
 - 3. Verify that door frames are set for thickness of wallboard to be used.
 - 4. Repair protrusions of framing, twisted framing members, and unaligned members before installation of wallboard commences.
 - 5. Verify openings and backing for recessed and surface mounted accessories and equipment.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning installation indicates acceptance of existing conditions.

3.2 APPLICATION OF GYPSUM BOARD

- A. Apply materials in conformance with ASTM C840, GA -216, GA-223, GA-239, the manufacturer's printed installation instructions, and as indicated or specified. Install gypsum board for fire-rated assemblies in accordance with UL or other design numbers indicated on the Contract Documents.
- B. Apply gypsum panels to the supporting framing as follows, unless otherwise indicated:
 - 1. On vertical surfaces, apply panels with long edges parallel to supporting framing members and with abutting panel edges centered on a framing member. Make abutting edge joints occur at different studs for panels on opposite sides of partitions, and in successive layers of multiple layers on the same side of partitions.
 - a. To minimize joints, panels may be applied with long edges parallel or perpendicular to framing members on vertical surfaces above ceilings, above 10 feet, or where concealed behind plywood finish surfaces. Long edges shall be applied parallel to supporting framing where required to meet provisions of applicable codes or to conform to listings for required fire ratings.
 - 2. On horizontal surfaces, apply panels with long edges perpendicular to supporting framing members and with abutting panel ends centered on a framing member. Stagger end joints in adjacent panel rows.
- C. Use sheets of maximum lengths practicable to minimize joints.
- D. Neatly fit edges and stagger joints.
- E. Cut and fit neatly around outlets and switches. Back-to-back wall penetrations shall be at least one stud space apart for acoustical insulation.
- F. Provide water resistant gypsum wallboard on walls at kitchens, toilet rooms, janitor rooms, and other "wet" areas as scheduled.

1. Seal cut edges and fasteners with edge sealant in accordance with wallboard manufacturers printed installation instructions.
 2. Seal joints with water resistant joint compound.
- G. Isolation of Wallboard from Other Construction
1. Provide perimeter relief where wallboard abuts structural decks, ceilings, vertical structural elements, or window sections.
 2. Finish wallboard edge with metal casing bead of type indicated or specified. Casings may be omitted in concealed areas above ceilings.
 3. Seal space between casing bead and structure with continuous sealant bead in accordance with Section 07 90 00.
 4. Seal around electrical boxes and conduit and pipe penetrations.
 5. Seal at base of wallboard sheets as indicated.
- H. Installation of Fasteners
1. Do not locate fasteners less than 3/8 inch from edges or ends of sheets.
 2. Non-Fire-Rated Partitions: Unless otherwise indicated on the Contract Documents, provide fasteners along perimeter edge and field area bearings at not over 12 inches on center. Do not install fasteners on any bearing partition closer than 8 inches below top track of partition secured to overhead structures.
 3. Drive shank perpendicular to wallboard surface.
 4. Drive fasteners with power driven oval hammer as recommended by wallboard manufacturer. Do not hammer screws. Install using screw guns with magnetic bit and depth locator.
 5. Set fastener heads slightly below surface of wallboard, but do not break or strip paper face around fasteners.
 6. Stagger fasteners opposite each other on adjacent ends or edges.
- I. Installation of Metal Trim
1. Provide metal corner bead at vertical and horizontal external corners and angles.
 2. Install metal edge trim at junctions of wallboard and other materials and at exposed edges.
 3. Provide control joints where indicated and at intervals not to exceed 30 feet in each direction in continuous vertical and horizontal surfaces.
 4. Reveal Trim:
 - a. Provide for locations indicated, set to straight lines, joints neatly fitted, mitered at corner returns.
 - b. Secure each piece into place using full and continuous bed of adhesive.
 5. Metal trim may be omitted behind plywood wall finishes and where permitted by listings for fire-rated assemblies.

3.3 TAPING AND FINISHING

- A. Mix joint and finishing compounds in accordance with referenced standard and manufacturer's printed instructions.
- B. Joints
1. Center tape over joint and embed in uniform layer of joint compound of sufficient width and depth to provide firm and complete bond.
 2. Apply skim coat while embedding tape.

- C. Treat angles with reinforcing tape and metal trim folded to conform to adjacent surfaces for straight and true angles and edges.
- D. Allow a minimum of 24 hours drying time between applications of compounds.
- E. Apply minimum of two coats of finishing compound over joint compound and tape unless otherwise specified. Apply as many coats as required to assure that joints and depressions will be invisible after application of finish.
 - 1. Spread first coat evenly and feather out beyond edges of tape and embedding compound, so that camber is 1/32 inch or less.
 - 2. After first finishing coat is thoroughly dry, cover with second coat with edges out beyond the preceding coat.
 - 3. Do not apply finishing compound to joints of water resistant wallboard in areas to receive ceramic tile finish.
- F. Give dimples at fastener heads and marred spots on surface of wallboard one coat of joint compound and minimum of three coats of finishing compound, applied in same manner as specified hereinbefore.
- G. Treat metal trim applications as follows:
 - 1. Conceal exposed flanges of metal trim with a minimum of two coats of compound.
 - 2. Extend compound 8 inches to 10 inches each side of metal nosing or trim.
- H. After each application of joint or finishing compound has dried, lightly sand joints.
- I. Finish surfaces shall be plumb, have straight surfaces with no waves or buckles, and shall be free of unevenness at joints. Surfaces shall be uniformly smooth and ready for painting, wall covering, or other finishes.
- J. At electrical closets and other areas indicated to be fire-taped, perform minimum taping and cementing of joints and fastener heads to meet applicable code requirements.

3.4 ALLOWABLE TOLERANCES

- A. Gypsum wallboard surfaces shall have no measurable variation in any 24 inch direction and a maximum variation of 1/8 inch in 10 feet when a straightedge is laid on the surface in any direction.
- B. Shim Work as required to comply with specified tolerances.
- C. Do not exceed 1/16-inch offset between planes of abutting sheets at edges or ends.

3.5 REPAIR, CLEAN-UP

- A. Repair fastener pops by driving a new fastener approximately 1–1/2 inches from the fastener pop and reset the popped fastener. When face paper is punctured, drive a new fastener approximately 1–1/2 inches from the defective fastener. Fill damaged surfaces with compound.
- B. Upon completion of installation, remove from adjacent surfaces overspray, splatter, and daubs of taping and finish compound.

3.6 PROTECTION

- A. Maintain temperature and humidity conditions required by manufacturer to protect the installation. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 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 or discoloration.
- C. Protect completed Work from damage or deterioration until Final Acceptance.

END OF SECTION

SECTION 092236

LATH

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Metal lathing for wet plaster finish.
 - 2. Metal accessories and miscellaneous materials.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 05 50 00 - Metal Fabrications.
 - 3. Section 09 24 00 - Portland Cement Plastering.

1.2 REFERENCES

- A. ASTM C954 - Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. in Thickness.
- B. ASTM C1002 - Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- C. FS-UU-B-790a - Federal Specification Building Papers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content, the manufacturer, and the source of the recycled content data.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products and materials in original unopened packages, containers, or bundles with manufacturer's label intact and legible.
- B. Remove items delivered in broken, damaged, rusted, or unlabeled condition from Project site immediately.
- C. Protect metal lath, metal suspension materials, and metal accessories from moisture and other sources of damage.
- D. Store metallic materials and accessories indoors, off the floor.

PART 2 PRODUCTS

2.1 LATH

- A. Materials: Copper-bearing steel; coated with rust-inhibitive paint after cutting, or cut from zinc-coated steel sheets.
 - 1. Recycled Content: Provide steel products with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. 3/8-inch Rib Lath for Suspended Plaster Ceilings: 3.4 pounds per square yard, fabricated in herringbone mesh pattern with 3/8-inch deep ribs.
- C. Lath with Membrane: K-Lath Keymesh Type SFB woven steel wire with 1-1/2-inch openings and weight of 2.2 pounds per square yard laminated between high wet strength suction paper or Class D Breather paper.

2.2 FASTENERS

- A. Provide galvanized fasteners in size and type to suit application, and in compliance with applicable codes and regulations.
- B. Screws
 - a. ASTM C1002, corrosion resistant, for attachment to metal framing 25 gauge and lighter.
 - 2. Thread and head designs and lengths as recommended by manufacturer for uses and materials involved.
- C. Tie Wire: Galvanized Steel, 20 gauge minimum.

2.3 METAL ACCESSORIES

- A. Manufacturer: Member of Metal Lath/Steel Framing Association (ML/SFA).
- B. Corner Beads, Casing Beads and Plaster Stops: 0.017-inch thick zinc alloy with expanded metal wings.
- C. Control Joints: 0.017-inch thick zinc alloy with expanded metal wings; Style No. 15 for flat surfaces; Style No. 30 for corners.
- D. Channel Screed (Reveal): Extruded Aluminum, Fry Reglet; PCS 100-100, clear anodized finish.
- E. Drip Screed: Superior; Set superior suffix corner GWS.
- F. Weep Screed: Superior; SWS Superior Weep Screed.

2.4 MISCELLANEOUS MATERIALS

- A. Provide additional components and materials required for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the installation of lathing.
- B. All pipe, conduit, and similar materials shall have been installed, inspected, and approved prior to commencing installation of lath.
- C. Do not commence the installation until unsatisfactory conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION - METAL LATH

- A. Install metal lath with long dimension of sheets perpendicular to supports.
- B. Tie ends of lapped sheets not occurring over supports. Tie at 6 inches on center.

3.3 INSTALLATION - LATH WITH MEMBRANE

- A. Install one layer of underlayment over areas to receive lath with membrane. Install horizontally with each course shingled (weather lapped) 2 inches over layer below.
- B. Install lath with membrane over underlayment in accordance with manufacturer's instructions.

3.4 INSTALLATION - METAL ACCESSORIES

- A. Fasten in place as required to prevent dislodging or misalignment by subsequent operations.
- B. Fasten at both ends and at a maximum of 12 inches on center along sides.
- C. Bring grounding edge of accessories to true lines, plumb, level, and straight.
- D. Install accessories to provide required depth of plaster and to bring plaster surface to required plane.
- E. Connect lengths of accessories as recommended by the manufacturer to assure a continuous line.
- F. Install casing beads to provide a minimum 1/8-inch clearance between structural units and termination points of surfaces to receive plaster finish.
- G. Attach control joints directly to base lath, spaced on 15 feet on center, both ways, unless otherwise indicated on the Contract Documents. Provide 14-gauge galvanized steel backing plate at each control joint.
- H. Provide special screeds at locations as indicated on the Contract Documents.

- I. Use single length of metal beads wherever length of run does not exceed longest standard stock length available; miter or cope corners.
- J. Set beads level, plumb, and true to line. Shim as required and align joints with concealed splices or tie plates.
- K. Provide casing beads at the following locations:
 - 1. Where plaster abuts dissimilar construction.
 - 2. At perimeter of openings where edges of plaster will not be concealed by other Work.

END OF SECTION

SECTION 092400

PORTLAND CEMENT PLASTERING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Portland cement plaster system.
 - 2. Finish coat system.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 07 90 00 - Joint Protection.
 - 3. Section 09 22 36 - Lath.

1.2 REFERENCES

- A. ASTM C35 - Inorganic Aggregates for use in Gypsum Plaster..
- B. ASTM C150 - Portland Cement.
- C. ASTM C206 - Finishing Hydrated Lime.
- D. ASTM C631 - Bonding Compound for Interior Gypsum Plastering.
- E. ASTM C897 - Aggregate for Job-Mixed Portland Cement-Based Plasters.
- F. ASTM C926 - Application of Portland Cement-Based Plaster.
- G. ASTM 932 - Surface-Applied Bonding Agents for Exterior Plastering.
- H. ASTM C1002 - Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- I. ASTM C1063 - Installation of Lathing and Furring to Receive Interior and Exterior Portland Plaster.
- J. ASTM C1328 - Plastic (Stucco) Cement.
- K. ASTM E119 - Fire Tests of Building Construction and Materials.
- L. UL - Underwriters Laboratories, Inc. Fire Resistance Directory.
- M. PCA – Portland Cement Association, Portland Cement Plaster/Stucco Manual.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs

for each product having recycled content, the manufacturer, and the source of the recycled content data.

2. For sealants include printed statement of VOC content.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured materials in original unopened packages or containers with manufacturer's label intact and legible.
- B. Keep cement and lime dry, stored off ground, under cover, and away from damp surfaces.
- C. Remove wet and deteriorated materials from Project site.
- D. Protect metallic materials and accessories from moisture and other sources of damage.
- E. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.5 FIELD SAMPLES

- A. Provide field samples in accordance with Division 1.
- B. Construct field sample panel to minimum 5 foot by 8 foot size, illustrating surface finish.
- C. Locate where directed.

1.6 PROJECT CONDITIONS

- A. Provide sufficient heat and ventilation at enclosed areas where Work of this Section is being performed to allow cement plaster to properly cure.
- B. Take precautionary measures necessary to assure that excessive temperature changes do not occur. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
- C. Do not apply plaster when substrate or ambient air temperature is less than 40 degrees F nor more than 80 degrees F.
- D. Maintain minimum 40 degrees F ambient temperature from 48 hours prior to application, during application, and continuously after application.
- E. Protect cement plaster from uneven and excessive evaporation during hot, dry weather.
- F. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 PRODUCTS

2.1 BASE-COAT MATERIALS

A. Portland Cement: ASTM C150. Type I or Type II.

B. Aggregates: ASTM C897.

1. Gradation Base (Scratch and Brown) Coats:

a. Percent Retained by weight (+/- 2 percent)

<u>U.S. Standard Sieve</u>	<u>Minimum</u>	<u>Maximum</u>
No.8	0	10
No.16	10	40
No.30	30	65
No.50	70	90
No.100	90	100

C. Bonding Agent: ASTM C631; type recommended for bonding plaster to concrete and concrete masonry surfaces.

D. Admixture: 1/2-inch alkaline-resistant chopped glass fibers.

1. Manufacturer:

a. Cem-FIL Corporation.

E. Water: Clean, potable, and free from substances harmful to plaster.

2.2 FINISH COAT MATERIALS

A. Manufacturer:

1. Sto Power Wall Stucco System.

2. La Habra.

3. Approved Equal.

B. Factory prepared product containing all materials required for finish coat, except water.

C. Finish: Smooth finish.

2.3 MIXING

A. Accurately proportion materials for each plaster batch with measuring devices of known value.

B. Size batches for complete use within one hour maximum after mixing.

C. Re-temper plaster stiffened from evaporation, but do not use or re-temper partially hydrated plaster.

D. Do not use caked or lumping materials, and remove such materials from Project site immediately.

E. Mix factory prepared plaster in accordance with the manufacturer's written instructions.

- F. Use moist, loose sand in mix proportions.
- G. Withhold 10 percent of mixing water until mixing is almost complete, then add as needed to produce necessary consistency.
- H. Hand Mixing: Do not hand mix, unless authorized by the Owner Representative.
- I. Mechanical Mixing
 - 1. Clean mixer of set or hardened materials before loading for new batch.
 - 2. Maintain mixer in continuous operation while adding materials.
 - 3. Conform to mixing sequence, cycle of operations, and time recommended by manufacturer of plaster materials.
- J. Mix Proportions by Volume
 - 1. Scratch Coat: Four parts aggregate to one part cement, by volume.
 - 2. Brown Coat: Five parts aggregate to one part cement, by volume.
 - 3. Hydrated lime in an amount not exceeding 20 pounds per sack of Portland cement may be added to mix using Type I or Type II Portland cement; do not add hydrated lime to mixes containing plastic cement.
 - 4. Finish Coat: In accordance with the manufacturer's instructions.
 - 5. Admixture: 1/2 of 1 percent, at exterior applications only.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and ready to receive Work. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work. Notify the Owner Representative, in writing, of any conditions requiring corrective action.
- B. Verify that surfaces to be plastered are free of dust, loose particles, oil, and other foreign matter which would affect bond of plaster coats. Verify joints in masonry are cut flush. Verify concrete surfaces are flat and honeycomb is filled flush.
- C. Verify items and services within walls have been installed, tested as required, and approved.
- D. Examine construction, grounds, and accessories to ensure that finished plaster surfaces will be true to line, level, and plumb, without requiring additional thickness of plaster.
- E. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning application means acceptance of existing conditions.

3.2 PREPARATION

- A. Cover building openings in areas adjacent to plastering Work with plastic film.
- B. Protect finished surfaces installed prior to plastering by covering with a suitable nonstaining material. Cover window and curtain wall frames with plastic film.
- C. Maintain protection in place until completion of plastering Work.

- D. Dampen masonry surfaces to reduce excessive suction.
- E. Clean concrete surfaces of foreign matter. Clean surfaces using acid solutions, solvents, or detergents; wash with clear water.
- F. Roughen smooth concrete surfaces and apply bonding agent. Apply bonding agent in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Installation of Accessories: Specified in Section 09 22 36.
- B. Provide three-coat application over metal lath.
- C. Apply plaster by hand or machine spray.
- D. Interrupt plaster coat only at junctions of plaster planes, at openings, or at control joints.
- E. Apply scratch coat over lath with sufficient material and pressure to fully keys through and embed metal base. When firm, score in one direction.
- F. Apply brown coat to scratch coat or masonry or concrete substrate, bringing out to grounds, flat to true surface, and free of imperfections which would reflect in finish coat.
- G. Reconsolidate brown coat by floating, and roughen to assure bond with finish coat.
- H. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on the Contract Documents.
- I. Acoustical Sealant: Where required, seal joints between edges of plasterwork and adjacent construction with acoustical sealant.
- J. Apply finish coat in accordance with manufacturer's instructions.
- K. Nominal Plaster Thickness:
 - 1. Scratch Coat: 3/8 inch, minimum, measured from face of Lath.
 - 2. Brown Coat: 3/8 inch.
 - 3. Finish Coat: 1/8 inch, minimum.
 - 4. Total Thickness: 1 inch, minimum over lath; 1/2-inch minimum over solid substrate unless otherwise indicated on the Contract Documents.

3.4 CURING

- A. Maintain moist conditions by fine fog spraying.
- B. Cure scratch coat for a minimum of 48 hours, and maintain a minimum of 48 hours between application of scratch coat and brown coat.
- C. Cure brown coat for a minimum of 48 hours, and maintain a minimum of 7 days between the application of the brown coat and finish coat.
- D. Cure finish coat in accordance with the manufacturer's instructions.

3.5 COMPLETION

- A. Remove temporary protection and enclosure of other Work. Promptly remove plaster from door frames, windows, and other surfaces not indicated on the Contract Documents to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.
- B. Upon completion of application, point up plaster around trim and other locations where plaster meets dissimilar materials.
- C. Cut out and patch defective or damaged plaster.
- D. Match patching or defective or damaged plaster to existing Work in form and texture.
- E. When complete, plaster surfaces shall be flat; true to plane; and free from scaffold and tool marks, stains, or other damage or defects and shall be uniform in color and texture throughout the Work.

3.6 TOLERANCES

- A. Allowable Tolerance of Finished Surface: Maximum deviation from true plane shall not exceed 1/8-inch as measured from the line of a 10-foot straightedge placed at any location on the surface.

3.7 CLEANING

- A. Remove plaster and protective materials from control and expansion joints, perimeter beads, and adjacent surfaces.
- B. Remove stains that would adversely affect subsequent finishes on plaster.

END OF SECTION

SECTION 095100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Acoustical tile.
 - 2. Acoustical panels.
 - 3. Suspended metal grid ceiling system, materials and fastening.
 - 4. Trim, clips, adhesives, and other related accessories.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements

1.2 REFERENCES

- A. ASTM A641 - Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- B. ASTM C635 - Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- C. ASTM C636 - Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- D. ASTM D1779 - Adhesive for Acoustical Materials.
- E. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products
- F. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- G. ASTM E119 - Test Methods for Fire Tests of Building Construction and Materials.
- H. ASTM E488 - Test Method for Strength of Anchors in Concrete and Masonry Elements.
- I. ASTM E580 - Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint.
- J. ASTM E1190 - Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.
- K. ASTM E1264 - Classification for Acoustical Ceiling Products.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Where indicated, provide acoustical ceilings identical to those of assemblies tested for fire resistance per ASTM E119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Shop Drawings: Indicate panel layout; show locations of mechanical grills, lighting, access panels, and other items affecting ceiling installation.
- C. Product Data: Indicate components specified in this Section.
 - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content, the manufacturer, and the source of the recycled content data.
 - 2. For adhesives include printed statement of VOC content.
 - 3. For acoustical panels include printed statement of VOC content and ASTM D 5116 emission test results.
- D. Samples
 - 1. Submit full range of manufacturer's standard colors for color selection.
 - 2. Submit 12-inch square samples for each type and size acoustical unit required.
 - 3. Submit sample of suspension system; 12 inches long.
- E. Manufacturer's installation instructions for suspended grid system and adhesives.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide factory wrapping, packaging, and other means necessary to prevent damage or deterioration during shipment, handling, and storage.
- B. Maintain protective coverings in place and in good repair until removal is necessary for the Work.
- C. Store products inside enclosed storage facilities or closed building, supported above grade and slabs-on-grade.
- D. Maintain storage spaces and products in dry condition, and within temperature extremes recommended by manufacturer.
- E. Follow special instructions of manufacturer.

1.6 PROJECT CONDITIONS

- A. Building shall have been entirely enclosed, with temperature and humidity closely approximating the conditions that will exist during occupancy, for not less than 10 days before start of installation.
- B. Before installation, acoustical units shall have been stored within the spaces where they are to be used, for at least 3 days with cartons opened and stripped sufficiently to permit units to stabilize to ambient conditions.

PART 2 PRODUCTS

2.1 ACOUSTICAL TILE

A. Acoustical Panels, General

1. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 50 percent by weight.
2. Sustainability Requirements: Provide acoustical as follows:
 - a. Zero-emitting: Acoustic panels tested according to ASTM D 5116 and shown to emit less than 3 $\mu\text{g}/\text{m}^3$ (2 ppb) formaldehyde, **or**
 - b. Low Emitting: Acoustic panels tested according to ASTM D 5116 and shown to emit less than 14 $\mu\text{g}/\text{m}^3$ (11.5 ppb) formaldehyde.

B. Manufacturers

1. Armstrong World Industries, Inc; Travertone Series. (verify product exists and compliance with formaldehyde requirements)
2. USG Interiors; Omni-Fissured. "F"-Fissured
3. Celotex; Hytone - Fissured. (verify product exists and compliance with formaldehyde requirements)

C. Tile

1. Description: Modulated, cast or molded incombustible mineral fiber; border units for tiles less than full size.
2. Design: Fissured.
3. Field Size:
 - a. 12 inches square, 3/4-inch thick.
 - b. 2 x 4 feet, 3/4-inch thick.
4. Edges: Square.
5. NRC Range: 0.60 to 0.70
6. Continuous Ceiling STC Range: 30-34 dB; [11] frequency range
7. Flame Spread Classification, ASTM E84: 0-25.
8. Light Reflectance Classification: LR-1.
9. Finish and Color: Factory-applied, washable, in manufacturer's standard white color.

2.2 SUSPENDED GRID SYSTEM

A. General

1. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Manufacturers

1. Chicago Metallic Corp; 1800 System for non-rated assemblies.
2. Armstrong Industries.
3. USG Interiors, Inc.; DX System.
4. Roblin Industries.
5. Donn Corporation.

C. Type: Direct suspension, supported and braced by connections to overhead structures; non fire-rated, exposed steel grid system.

D. Structural Classification: Heavy duty, meeting requirements of ASTM C635, and as specified.

E. Components:

1. Factory fabricated, punched, and otherwise prepared to facilitate rapid installation with minimum field Work for typical conditions.
 2. Items of like type and size shall be readily interchangeable without modification.
- F. Grid Runners:
1. Type: Bulb tee section, double-web type, formed from electro-galvanized steel strip in thickness required to meet specified duty classification, 24 gauge minimum.
 2. Main Runners: 15/16-inch wide flange, 1-1/2-inch high web.
 3. Cross Runners: 15/16-inch wide flange, 1 1/8-inch high web.
- G. Exposed-grid Accessories:
1. Perimeter angles, reveals, and other items detailed; roll formed from electro-galvanized steel strip to sizes indicated or required for Project conditions, and as accepted.
 2. For fixed connection of runner ends to wall angles, 1/8-inch diameter pop rivets; head color to match exposed grid.
- H. Finish: Manufacturer's standard low-gloss sheen baked enamel, color as selected by Owner Representative.

2.3 SUSPENSION MATERIALS AND FASTENINGS

- A. Wire
1. General: ASTM A641, galvanized double-annealed steel, regular coating, soft temper; factory pre-straightened units.
 2. Hanger and Safety Wires: 12 gauge, unless otherwise indicated.
 3. Ceiling and Partition Bracing Wires: 10 gauge, unless otherwise indicated.
- B. Turnbuckles: As required for leveling grid assemblies, of adequate size, electroplated.
- C. Fastenings for Accessories
1. Bolts or screws of adequate size, in types appropriate for conditions and materials involved, and made of corrosion-resistant materials or coated as accepted.
 2. Concealed only, unless otherwise indicated or accepted.
- D. Post-Installed Anchors: Proprietary type, designed for intended uses, and ICC ESR evaluated.
1. Manufacturers
 - a. ITW Ramset/Red Head.
 - b. Simpson.
 - c. Hilti Co.

2.4 MISCELLANEOUS PRODUCTS

- A. Perimeter Trim:
1. Molded plastic channel type trim.
 2. White color closely keyed to tile color.
 3. Required for each installation area, unless otherwise indicated.
- B. Panel Perimeter Trim at Ceiling Access Panels in Rated Ceiling Areas:
1. 24 gauge minimum metal channel type perimeter trim.
 2. White color closely keyed to tile color.
 3. Provide for full perimeter of each access panel.

- C. Installation Adhesive: ASTM D1779, Class A flame spread as recommended by acoustical tile manufacturer for application of acoustical tile to gypsum wallboard substrates.
 - 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24),]

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the installation of acoustical ceiling systems.
- B. Verify that wet work such as plastering and painting has been completed and is thoroughly dry, and that rough mechanical and electrical Work has been completed in the area above which the ceiling will be installed.
- C. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Coordinate installation of hanger wires with Section 05 30 00: Metal decking.

3.3 INSTALLATION

- A. Installation shall be in accordance with the manufacturer's printed instructions.
- B. Hanger Wires:
 - 1. Provide for main runners and cross runners within 8 inches of ceiling perimeter and breaks in ceiling plane.
 - 2. Provide counterbraced wires for hanger wires more than 1 to 6 out of plumb.
 - 3. Secure hanger wires with three tight turns within 1-1/2 inches maximum length.
 - 4. Separate hanger and bracing wires from unbraced ducts, pipes, etc.
- C. Bracing-Wire Assemblies:
 - 1. Provide hanger and four-way bracing wire sets for each 96 square feet of ceiling area, located and spaced in accordance with referenced standards.
 - 2. Bracing Wires: Provide set of four of splay wires at a maximum of 45 degrees unless other specifically designed and detailed bracing is provided. Provide first set of splay wires at 48 inches from walls.
 - a. Wires: Taut without causing ceiling to lift.
 - b. Secure bracing wires with four tight turns for 12 and 10 gauge and three tight turns for 8 gauge within 1-1/2 inches maximum length.
 - 3. Attachment of Clip to Unfilled Metal Decking overhead: Locate clip on the side of the deck flute furthest from the ceiling splay point such that connecting screws are acting in shear rather than in tension (pull out).
- D. Ceiling Grid:
 - 1. Attach to adjacent walls, Separate at least 1 inch from adjacent walls.
 - 2. Interconnect cross runners over 12 inches long and main runners not connected to walls.
 - 3. Interconnect near free end with 16-gauge tie wire or metal strut securely attached to prevent spreading.

4. Unless otherwise indicated, center system on room axis leaving equal border units greater than one half panel width on each side.
- E. Installation Tolerances:
1. Bottom surface plane of each assembly shall be within plus-or-minus 1/8 inch of ceiling height required.
 2. Bottom surface plane of each assembly shall be level and true to plane within 1/8 inch in 12 feet.

3.4 MECHANICAL AND ELECTRICAL WORK

- A. For locating safety wires, obtain layouts and/or instructions specified to be furnished as part of the Work of DIVISIONS 21, 22, 23, 25, 26, 27 AND 28.
- B. Secure light fixtures to ceiling grid to resist horizontal force equal to weight of fixture.
1. Flush or Recessed Light Fixtures, Air Terminals, and Services: Independently support by not less than four taut 12-gauge wires capable of supporting four times load.
 2. Surface Mounted Light Fixtures: Support with at least two positive clamped devices made of minimum 14-gauge steel surrounding ceiling runner and supported from structure above with 12-gauge wire. Rotational spring clips not allowed.
 3. Pendant Mounted Light Fixtures: Support directly to structure above with hanger wires through each pendant capable of supporting four times load.

3.5 PERIMETER TRIM

- A. Trim shall be of same material, finish, and color as that of suspension system, unless otherwise specified, and of size and configuration indicated.
- B. Provide in longest lengths available and combinations of lengths to minimize number of joints required.
- C. Pieces shorter than 48 inches will not be permitted.
- D. Miter joints at corners.
- E. Install to neatly close with adjoining vertical surfaces.

3.6 INSTALLATION OF ACOUSTIC PANELS

- A. Prepare acoustic panels to be used as ceiling access panels with full panel perimeter trim. Install panels at location of access requirements. Secure to metal ceiling grid with #8 x 1 inch long tamper proof metal fastener screws at 16 inches on center, equally spaced and no further than 8 inches from any corner.
- B. Install acoustic panels using hold-down clips so that no individual panel may be removed without visible damage to panel; minimum 4 clips per panel. Install panels loose, without hold-down clips, where specifically indicated.
- C. Install removable acoustic panels using hold-down clips secured to suspended grid with tamper proof metal fasteners, so that no individual panel may be removed without special tools or visible damage to panel; minimum 4 clips per panel.

3.7 ADHESIVE INSTALLATION OF ACOUSTICAL TILE

- A. Apply adhesive in accordance with the manufacturer's printed instructions.
- B. Install acoustical tile with edges lightly butted, and with units securely adhered to substrate.

3.8 FIELD QUALITY CONTROL

- A. When complete, grid members of each assembly shall be mutually parallel/square, accurately aligned to positions intended, with joints neatly formed, closely fitted and aligned flush; and each assembly shall be securely anchored and braced to structure to prevent movement.
- B. Acoustical units installed in grids shall rest uniformly on their supporting members and shall be flat and free from twist and warp.
- C. Joints of adhesive-installed acoustical units shall be accurately aligned, straight, and free from gaps and offsets across adjoining units.

3.9 CLEANING

- A. Exposed surfaces of grids and acoustical units shall be clean and free from scratches, dents, tool marks, stains, discoloration, fingerprints, and other defects and damage.

END OF SECTION

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SECTION 096100
FLOORING TREATMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clear floor sealer.

B. Related Sections:

1. Section 01 81 13 - Sustainable Design Requirements
2. Section 03 30 00 - Cast-In-Place Concrete.
3. Section 09 90 00 - Painting and Coating: Standard paint coatings and finishes.

1.2 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM E96 - Water Vapor Transmission of Materials.
- C. FS TT-C-550C NOT 1- (Federal Specification) Coating System, Glaze, High Performance, (Solvent Base) for Interior Surfaces.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data
 1. Indicate manufacturer, product, and conformance with specified requirements.
 2. Include complete range of manufacturer's standard colors for color selection.
 3. For coatings include printed statement of VOC content and chemical components.
- C. Manufacturer's application instructions.

1.4 QUALITY ASSURANCE

- A. Applicator: Company approved by floor sealer manufacturer.

1.5 PROJECT CONDITIONS

- A. Ensure adequate illumination, ventilation, and dust free environment during application and curing of materials

PART 2 PRODUCTS

2.1 GENERAL

- A. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Floor Coatings: VOC not more than 100 g/L.

- B. Chemical Components of Field-Applied Interior Paints and Coatings:
 - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing 1 or more benzene rings).
 - 2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.

2.2 MANUFACTURER

- A. Euclid Chemicals; Euco #512 Epoxy Sealer.
- B. Sonneborn; Kure-N-Seal.
- C. L+M Construction Chemical, Seal Hard.
- D. 3M; Concrete Protector and Restorer (CPCR).

E. Creteseal; CS2000.

2.3 MATERIALS

- A. Accessory Materials: Fillers, thinners, and other materials of type recommended by sealer manufacturer for intended application.
- B. Fire Hazard Classification: Class A in accordance with ASTM E84.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions are suitable to receive the Work of this Section.
- B. Do not begin application until unsuitable conditions have been corrected. Beginning application means acceptance of existing conditions.

3.2 PREPARATION

- A. Remove or protect items not required to be coated.
- B. Clean and prepare substrate surfaces in accordance with manufacturer's instructions.
- C. Remove dust, dirt, loose and foreign materials.
- D. Fill hairline cracks, holes, and similar defects with filler compatible with finish treatment.

3.3 APPLICATION

- A. Mix and apply sealer in accordance with manufacturer's instructions, using brush, roller, or spray.
- B. Apply at coverage rate recommended by manufacturer.
- C. Edges abutting other materials and colors shall be sharp and clean without overlapping.
- D. Finish surfaces shall be uniform in finish and color.

3.4 CLEANING

- A. During progress of the Work, and upon completion, clean adjacent surfaces and materials of spills, splatters, spills, and stains resulting from application. Remove using methods recommended by manufacturer and approved by the Owner Representative, exercising care to prevent damage to finish surfaces and materials.
- B. Touch up damaged surfaces before final acceptance.

END OF SECTION

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SECTION 096500
RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient tile flooring.
 - 2. Resilient sheet flooring.
 - 3. Resilient bases.
 - 4. Related accessories.
- B. Related Sections:
 - 1. Section 01 81 13 - Sustainable Design Requirements

1.2 REFERENCES

- A. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
- B. ASTM E84 - Surface Burning Characteristics of Building Materials.
- C. ASTM F1066 - Vinyl Composition Floor Tile.
- D. ASTM F1303 Sheet Vinyl Floor Covering with Backing.
- E. ASTM F1700 - Solid Vinyl Floor Tile.
- F. ASTM F1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- G. ASTM F1913 - Sheet Vinyl Floor Covering without Backing.
- H. ASTM F2170 - Determining Relative Humidity in Concrete floor Slabs Using in situ Probes.
- I. FS L-F-1641 - Floor Covering, Translucent or Transparent Vinyl Surface, with Backing.
- J. FS L-F-475 - Floor Covering, Vinyl Surface (Tile and Roll), with Backing.
- K. FS RR-T-650 - Treads, Metallic and Non-metallic, Non-skid.
- L. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.
- M. ADA Accessibility Guidelines for Buildings and Facilities (ADAAG).

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data: For each type of product indicated.

1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content, the manufacturer, and the source of the recycled content data.
 2. For adhesives, sealants, and chemical-bonding compounds include printed statement of VOC content.
 3. For linoleum flooring include printed statement of costs for each rapidly renewable resource.
 4. For resilient flooring include documentation of FloorScore™ Certification.
- C. Samples:
1. Submit samples of manufacturer's full line of patterns and colors for selection by the Owner Representative.
 2. Submit for each type, pattern, and color of resilient flooring material selected.
 3. Tile samples shall be full size.
 4. Sheet vinyl samples shall be 12 inch by 12 inch.
 5. Accessories shall be 9 inches long, minimum.
- D. Manufacturer's installation instructions.
- E. Manufacturer's instructions for maintenance and stain removal.
- 1.4 QUALITY ASSURANCE
- A. Slip Resistance: Where required for conformance to accessibility standards, flooring shall conform to a minimum coefficient of friction of 0.5 when tested in accordance with ASTM D2047.
 - B. Minimum recycled content 50 percent post consumer of vinyl and 90 percent of rubber base.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials in manufacturer's original unopened containers with labels indicating brand names, colors and patterns, and quality designations legible and intact.
 - B. Do not remove markings until materials have been inspected and accepted.
 - C. Store and protect accepted materials in accordance with manufacturer's printed instructions.
 - D. Store materials in the original containers at not less than 70 degrees F for a minimum of 48 hours immediately prior to installation.
- 1.6 PROJECT CONDITIONS
- A. Maintain the temperature in spaces to receive resilient flooring materials between 70 and 90 degrees F for a minimum of 48 hours prior to installation, during installation, and 48 hours after installation. Thereafter, maintain a minimum temperature of 55 degrees F.
- 1.7 EXTRA MATERIALS
- A. Provide resilient flooring materials for replacement and maintenance.

- B. Clearly identify each carton as to contents. Indicate Project, Bid Package, Building and Room numbers.
- C. Include materials of each size, color, pattern and type incorporated in the Work.
- D. Vinyl Composition Tile: Provide one carton for each 1,500 square feet, or fraction thereof, of vinyl composition tile installed
- E. Seamless Flooring: Provide one percent of total installed area for each type, pattern, and color of sheet vinyl and seamless flooring installed.
- F. Accessories: Provide one percent of each type of accessory and trim for each size, color and type installed.

PART 2 PRODUCTS

2.1 SHEET LINOLEUM

- A. Manufacturer:
 1. Armstrong, Linorette-NATURCote.
 2. Azrock Floor Products Div:
 3. Tarkett Inc:
- B. Type: In conformance with FS L-F-475A(3), Grade A, Type II, having a backing suitable for adhesive application above, on and below grade.
- C. Thickness: 0.085 inch, minimum.
- D. Pattern and Color: As selected by the Owner Representative from manufacturer's standard range.
- E. Base: Self-coved. Provide wood cove backing.

2.2 VINYL COMPOSITION TILE

- A. Manufacturer:
 1. Armstrong Excelon Series.
 2. Azrock Floor Products Div:
 3. Tarkett Inc:
- B. Type: Composition of vinyl resins and fiber fillers, conforming to ASTM F1066, Type IV, Composition 1.
- C. Pattern and Color: Will be selected by the Owner Representative from manufacturer's standard range.
- D. Size: 12-inch square, 1/8 inch thick.
- E. Vinyl Composition Tile shall contain minimum of 25 percent recycled content.
- F. Slip Resistance: Product shall have a static coefficient of friction of 0.5 minimum under wet conditions in accordance with ASTM D2047.

G. Thickness: 0.080 inch, minimum.

2.3 RUBBER BASE

A. Acceptable Manufacturers:

1. Burke Flooring Products.
2. Roppe Rubber Corp.
3. Johnsonite.

B. Base: FS SS-W-40, Type I rubber; coved; 4 inches high; 1/8 inch thick.

C. Base Accessories: Premolded end stops, internal corners, and external corners of same material, size, and color as base.

D. Color: Selected by the Owner Representative from manufacturer's standard range.

E. Resilient base shall contain minimum of 25 percent recycled content.

2.4 ACCESSORIES

A. Material: Rubber or vinyl.

B. Reducer Strips: ASTM F1066, Type II, tapered- edge style, of thickness to suit abutting floor covering material.

C. Cap Strip: Round style, minimum 3/4 inch size.

D. Tread Nosing: Type indicated on the Drawings.

E. Color: To be selected by the Owner Representative from the manufacturer's standard range.

F. Thickness: Matching, or compatible with, thickness of abutting flooring material.

2.5 INSTALLATION MATERIALS

A. Installation materials shall be of the types and brands recommended by the flooring material manufacturer for the specific installation conditions, and include:

1. Adhesives: Water-resistant type recommended by floor covering manufacturer for products and substrates indicated.
 - a. For linoleum flooring use adhesives that have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1) VCT Adhesives: Not more than 50 g/L.
2. Primer.
3. Crack filler and leveling compound; Industrial Products, Inc. Vi-Tex Leveling Compound, Armstrong Floor Div. Underlayment S-180.
4. Welding rods for seamless flooring shall be in color selected by the Owner Representative from manufacturer's standards.
5. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
 - a. Use chemical-bonding compound that has a VOC content of 350 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Cove backing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the installation of resilient flooring materials.
- B. Verify surfaces are smooth and flat.
- C. Perform moisture test series to determine volume of vapor emission by standard anhydrous calcium chloride crystal test. Test results shall be expressed in pounds of emission within 1,000 square feet during 24 hours.
- D. Verify that concrete floors exhibit negative alkalinity, and do not exhibit carbonization or dusting, at the time of application of flooring.
- E. Correct all unsatisfactory conditions prior to the installation of resilient flooring materials.

3.2 PREPARATION

- A. Remove dirt, oil, grease, and other foreign matter from surfaces to receive resilient flooring materials.
- B. Fill cracks to provide a level surface for application of resilient flooring.
- C. Prohibit traffic from area until filler is cured.
- D. Vacuum substrate clean.
- E. Prime surfaces, if recommended by resilient flooring adhesive manufacturer.
- F. Seal concrete surfaces to receive resilient flooring with a topical vapor emissions membrane or sealer which is compatible with the adhesive and/or flooring if the vapor emissions rate from the concrete exceeds the recommendations of the flooring and/or adhesive manufacturer.

3.3 APPLICATION OF ADHESIVES

- A. Mix and apply adhesives in accordance with the manufacturer's printed instructions, except as specified.
- B. Provide safety precautions during mixing and applications as recommended by adhesive manufacturer.
- C. Apply adhesives uniformly over surfaces.
- D. Apply no more adhesive at any time than can be covered by resilient flooring material within manufacturer's recommended working time of the adhesive.
- E. Remove adhesive which dries or films over.
- F. Do not soil walls or adjacent areas with adhesive.
- G. Promptly remove spillage.

3.4 INSTALLATION - VINYL COMPOSITION TILE

- A. Install tile in accordance with manufacturer's instructions, except as specified.
- B. Mix tile from container to ensure shade variations are consistent.
- C. Install tile to square grid pattern with joints aligned.
- D. Do not lay tile less than one half width of a field tile, except where accepted by the Owner Representative for irregularly shaped rooms or spaces.
- E. Cut border tile neatly and accurately to fit within 1/64 inch of abutting surfaces.
- F. Fit tile neatly and tightly into breaks and recesses, around pipes and penetrations, under saddles or thresholds, and around permanent cabinets and equipment.
- G. At door openings where tile and other floor materials meet, make joinings under centers of doors.
- H. Following installation of tile, divert traffic from installation area for at least 24 hours.

3.5 INSTALLATION - SHEET LINOLEUM

- A. Install sheet vinyl in accordance with manufacturer's instructions, except as specified.
- B. Cut sheet material in lengths and sizes required.
 - 1. Cut for minimum number of seams and for pattern match between adjacent abutting edges.
 - 2. Double-cut, if required.
 - 3. Lay cut sheets flat and allow to acclimate to room temperature prior to installation.
- C. Work out wrinkles and air pockets.
- D. Roll material in two directions, starting at center of sheet.
- E. Butt edges of adjoining sheets.
- F. Heat-weld joints thoroughly.
- G. Self-coved Base
 - 1. Cut, fit, and miter sheet material at interior and exterior corners to form integral bases 5 inches high, unless otherwise indicated.
 - 2. Install fillet member to ease transition at intersection between floor and wall.
 - 3. Apply heavy coat of adhesive to vertical wall surfaces where sheet vinyl will be applied.
 - 4. Mask upper wall surface to avoid excessive adhesive above contact line.
 - 5. Install cap strip.

3.6 INSTALLATION - REDUCER STRIPS

- A. Apply adhesive and bond securely to substrate in straight, true lines.
- B. Provide where floor covering terminates exposing the edge of the covering.

- C. Center edge strips under doors where floor covering terminates at a door opening.
- D. Cut ends to fit edges of door frames and abutting surfaces; fit edges to adjoining floor coverings.
- E. Top of strips shall be flush with top of resilient flooring material.

3.7 INSTALLATION - RESILIENT BASE

- A. Install base in lengths as long as practical to minimize the number of joints and suit installation conditions.
- B. Install with tight butt joints. Fit joints tight and vertical.
- C. Install on solid backing. Bond tight to wall surfaces.
- D. Press down so that bottom edge follows floor profile.
- E. Use premolded units at exposed ends and external corners; miter internal corners.
- F. Scribe and fit to door frames and other interruptions.

3.8 INSTALLATION - MISCELLANEOUS ACCESSORIES

- A. Install accessories in accordance with manufacturer's instructions.

3.9 CLEANING AND PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Not less than four days following completion of installation of resilient flooring, clean surfaces with a neutral cleaner recommended by the flooring materials manufacturer for the type of material installed. Remove excess adhesive without damaging surfaces.
- C. For flooring materials requiring waxing, apply two coats of nonslip wax or other finish recommended by the flooring materials manufacturer following cleaning of flooring materials, and buff to a sheen.
- D. Protect completed installation from traffic and damage with a covering of heavy Kraft paper, taped at edges.

END OF SECTION

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SECTION 096800

CARPETING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Carpeting glue down method.
 - 2. Accessories.
- B. Related Sections
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 03 30 00 - Cast-In-Place Concrete: Floor substrate surface.
 - 3. Section 09 65 00 - Resilient Flooring: Terminate edging of adjacent floor finish.

1.2 REFERENCES

- A. AATCC - American Association of Textile Chemists and Colorists.
- B. AATCC 934 - Electrostatic property of carpets.
- C. ASTM D2646 - Test Methods for Backing Fabric Characteristics of Pile Yarn Floor Coverings.
- D. ASTM D3936 - Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.
- E. ASTM D5848 - Test Method for Mass per Unit Area of Pile Yarn Floor Coverings.
- F. ASTM D1335 - Tuft Bind of Pile Yarn Floor Coverings.
- G. ASTM D6859 - Test Method for Pile Thickness of Finished Level Pile Yarn Floor Coverings.
- H. ASTM E84 - Surface Burning Characteristics of Building Materials.
- I. ASTM E648 - Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- J. ASTM F710 - Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
- K. NFPA 271 - Standard Method of Test for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter.

1.3 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data: Provide product data for each product indicated, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

1. For carpet, documentation indicating compliance with testing and product requirements of Carpet and Rug Institute's "Green Label Plus" program.
 2. For carpet cushion, documentation indicating compliance with testing and product requirements of Carpet and Rug Institute's "Green Label" program.
 3. For installation adhesive include printed statement of VOC content.
- C. Shop Drawings: Submit carpet layout for joints in accordance with Section 01 33 23
- D. Samples: Submit two samples 24 inch by 24 inch for selection by Owner Representative. Label each sample with manufacturer's name, material description, color, pattern, and designation indicated on the Contract Documents.
- E. Maintenance Data: for carpet to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
- F. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in carpet with ten years minimum experience.
- B. Installer Qualifications: Company with five years minimum experience and approved by manufacturer.
- C. Carpet shall be one manufacturer and be of a single dye lot; be of first quality; no seconds or imperfections will be accepted.
- D. Carpet and carpet padding shall be low VOC emitting with a minimum of 50 percent recycled content, 10 percent from consumer.

1.5 PROJECT CONDITIONS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 70 degrees F ambient temperature three days prior to, during, and 24 hours after installation of materials.
- C. Environmental Limitations: Do not install carpet and carpet cushion until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- D. Do not install carpet and carpet cushion over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- E. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.6 WARRANTY

- A. Replace or correct carpet that is defective , including but not limited to the following:
 - 1. High or low tufts, rows or bands.
 - 2. Stop marks or wire marks.
 - 3. Off-color tufts, rows or bands.
 - 4. Missing tufts or rows.
 - 5. Visually apparent mend lines.
 - 6. Visually apparent yarn splices.
 - 7. Uneven shearing.
 - 8. Excessive bowing in either length or width.
 - 9. Mixed dye lots.
 - 10. Persistent latex or chemical odors.
 - 11. Excessively stiff backing.
- B. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units for each type indicated, not less than 100 square feet under provisions of Division 1.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Carpet: Commercial grade broadloom tufted carpet conforming to a state class 2, and in accordance with the following:
 - 1. Yarn Weight: 26 ounces per square yard per ASTM D5848.
 - 2. Tufts: 55 per square inch tufted through the backing with a uniform grid type spacing.
 - 3. Total Density Factor: 4600 minimum.
 - 4. Smoke Developed: 450 maximum per NFPA 271.
 - 5. Static Rating: 3.5 KV maximum per AATCC 134.
 - 6. Surface Flammability: Comply with DOC FF-1-70.
 - 7. Adhesion of Piled Fabric: Federal Standard No 191, Textile Test Method 5950.
 - 8. Tuft Bind: 6 pounds minimum per ASTM D1335.
 - 9. Flooring Radiant Panel Test: 0.45 Watt per sq cm maximum per ASTM E648.
 - 10. Color Fastness to Light: Shade change after 60 standard fading hours shall be not less than 4 per AATCC Test Method 16E.
 - 11. Resistance to Cracking: 4.0 or better on a scale of 1 to 5, both wet and dry per AATCC Test Method 8.
- B. Environmental Requirements: Provide carpet that complies with testing and product requirements of Carpet and Rug Institute's "Green Label Plus" program.

2.2 MANUFACTURERS

- A. Bigelow.
- B. Mohawk Carpet.
- C. Lees Carpet.

2.3 ACCESSORIES

- A. Sub-Floor Filler: Type recommended by carpet manufacturer.
- B. Primers and Adhesives: Waterproof; of types recommended by carpet manufacturer.
 - 1. VOC Limits: Provide primers and adhesives with VOC content not more than 50g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet and are ready to receive work.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Section 03 30 00 for slabs receiving carpet.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to leave smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Broom and vacuum floor surface to be covered immediately before installing carpet.

3.3 INSTALLATION

- A. Apply carpet and adhesive in accordance with manufacturers' instructions.
- B. Lay out rolls of carpet for approval.
- C. Verify carpet match before cutting to ensure minimal variation.

- D. Double cut carpet, to allow intended seam and pattern match. Match cuts straight, true, and unfrayed.
- E. Locate seams in area of least traffic.
- F. Fit seams straight, not crowded or peaked, free of gaps.
- G. Lay carpet on floors with run of pile in same direction as anticipated traffic.
- H. Do not change run of pile in room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- I. Cut and fit carpet around interruptions.
- J. Fit carpet tight to intersection with vertical surfaces without gaps.
- K. Do not bridge building expansion joints with carpet.

3.4 CLEANING AND PROTECTING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean and vacuum carpet surfaces.
- C. Prohibit traffic from carpet areas for 24 hours after installation.
- D. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of the construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION

SECTION 099000
PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Paint materials.
 - 2. Surface preparation.
 - 3. Exterior painting and finishing schedule.
 - 4. Interior painting and finishing schedule.

- B. Related Sections:
 - 1. Section 01 81 13 - Sustainable Design Requirements
 - 2. Section 03 30 00 - Cast-in-Place Concrete: Grout cleaned finish.
 - 3. Section 10 14 00 - Signage: Resin-coated vinyl signage.
 - 4. Section 10 14 36 - Non-Illuminated Panel Signage.

1.2 REFERENCES

- A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

1.3 DEFINITIONS

- A. Paint: Paint system materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate, or finish coats.

- B. Exposed: Visible in the completed Work.

- C. Unexposed: Concealed in the completed Work.

1.4 SYSTEM DESCRIPTION

- A. Surface preparation and finish painting of interior and exterior surfaces and miscellaneous components.

1.5 SUBMITTALS

- A. Submit in accordance with Division 1. In addition to the number of copies required by Division 1, submit two (2) extra copies for review by Owner's air pollution control consultant. The submittals shall include the initial and subsequent submittals.

- B. Samples:
 - 1. Samples of manufacturer's standard colors for color selection.
 - 2. Samples of Selected Colors and Finishes
 - a. Three sets of samples, using materials accepted for the Project, of each color and paint finish selected by the Owner Representative.
 - b. Prepare on 8 inch by 10 inch hardboard panels in a stair step manner so all required coats show.

- c. Label and identify each sample as to location and application.
 - 3. Resubmit samples as required until required sheen, color, and texture are achieved.
 - 4. Acceptance of samples for color, gloss, and texture shall in no way waive material quality requirements.
- C. Product Data: For each type of product indicated.
 - 1. For paints include printed statement of VOC content and chemical components.
- D. For consideration of products of manufacturers other than those named, in addition to the information required to be submitted for substitutions under the provisions of Division 0, for each product submit current (within the last 6 months) test data from a recognized independent testing laboratory, accompanied by a letter stating that the proposed products are equal to or better than those specified.
- E. Manufacturer's application instructions.

1.6 QUALITY ASSURANCE

- A. Paint materials not otherwise specified shall be products of one manufacturer regularly producing materials of types specified.

1.7 FIELD SAMPLES

- A. Provide field samples in accordance with Division 1.
- B. Construct field sample for each type of finish on each substrate.
- C. Paint a sample panel for each color selected.
- D. Large Surface Areas, More than 40 sf: Apply to entire surface in one plane, terminating only at corners.
- E. Small surface Areas, 40 sf or Less: Apply to minimum 4 sf.
- F. Construct field sample using surface preparation method, material, and application of material as specified.
- G. Review:
 - 1. Request in writing the Owner Representative's review after permanent lighting is in operation where field sample has been constructed.
 - 2. At the option of the Owner Representative, temporary lighting providing illumination of the same intensity, color, and character may be utilized for review of field samples.
 - 3. The Owner Representative will review field sample no later than 4 days following receipt of request.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver paints and stains ready mixed in labeled, tightly covered containers to the Project site.
- B. Store materials on pallets or skids in clean, dry, well-ventilated areas, away from heat, sparks, flame, and direct rays of sunshine; maintain storage areas free from fire hazard.

- C. Remove used rags and hazardous waste materials at end of work each day, unless properly stored in metal containers with tightly-fitting metal covers.
- D. Frequently remove accumulated waste materials.

1.9 PROJECT CONDITIONS

- A. Comply with manufacturer's recommendations for environmental conditions under which paint and paint systems shall be applied.
- B. Ensure adequate ventilation during interior painting.
- C. Do not apply exterior paint in rain, snow, fog or mist, when temperature is below 45 degrees F, or when relative humidity is above 50 percent.

1.10 WARRANTY

- A. Provide warranty under provisions of Division 1.
- B. Colors of surfaces painted as part of the work of this Section shall, at the end of one year, have remained free from serious fading.
- C. Paint shall have its original adherence at the end of one year and there shall be no evidence of blisters, running, peeling, scaling, chalking, streaks, or stains at the end of this period.
- D. Washing with alkali-free soap and water shall remove surface dirt from painted surfaces without producing deteriorating effects.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturer:
 - 1. Dunn-Edwards Paint Co.
 - 2. Fuller O'Brien Paint Company.
 - 3. ICI Paints.
 - 4. Frazee.

2.2 MATERIALS - GENERAL DESCRIPTION

- A. Wood Filler: Paste filler recommended by manufacturer for wood type used, in color according to color of stain finish scheduled or selected.
- B. Cementitious Filler: Nonshrink formulation; white portland cement with fine silicate aggregate, zinc-oxide pigment, and reinforcing chemical binder as approved.
- C. General Purpose Filler: Standard spackling compound or gypsum wallboard joint compound or latex patching compound; for patching plaster, gypsum wallboard, and wood surfaces to receive opaque paint finishes.
- D. Thinner: As recommended by each manufacturer for his respective product.

- E. Equipment: Provide scaffolding, staging, drop cloths, covers, brushes, rollers, and spraying and other equipment of the type, grade, and size required for proper execution of the Work.

2.3 MISCELLANEOUS SURFACE PREPARATION MATERIALS

- A. Concrete Cleaner (for the removal of grease and oils):
 - 1. Concrete Wash #17.
 - 2. Concrete Saver 108 Cleaning and Etching Solution.
 - 3. UGL Concrete[Etch and Clean.
- B. Galvanized Metal Chemical/Acid Etch
 - 1. Dunn-Edwards Galva-Etch Etching Liquid, GE 123.
 - 2. Approved Equal.

2.4 PAINT MATERIALS

- A. General
 - 1. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - a. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 - b. Nonflat Paints, Coatings, and Primers: VOC content of not more than 100 g/L.
 - c. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - d. Floor Coatings: VOC not more than 100 g/L.
 - e. Shellacs, Clear: VOC not more than 730 g/L.
 - f. Shellacs, Pigmented: VOC not more than 550 g/L.
 - g. Stains: VOC not more than 250 g/L.
 - h. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
- B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 - 2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Ethylbenzene.

- m. Formaldehyde.
- n. Hexavalent chromium.
- o. Isophorone.
- p. Lead.
- q. Mercury.
- r. Methyl ethyl ketone.
- s. Methyl isobutyl ketone.
- t. Methylene chloride.
- u. Naphthalene.
- v. Toluene (methylbenzene).
- w. 1,1,1-trichloroethane.
- x. Vinyl chloride.

- C. Primer/sealer for interior and exterior concrete masonry, and exterior cement plaster, shall contain or have properties which are equivalent to the following:
- 1. Vehicle: Acrylic and epoxy resins, water and additives.
 - 2. Pigments: Titanium dioxide and reinforcing pigments.
 - 3. Solids by Volume: 34 percent minimum.
 - 4. Solvent Type: Waterborne.
 - 5. Resin Type: Acrylic/epoxy.
- D. Primer for interior and exterior non-ferrous metal shall contain or have properties which are equivalent to the following:
- 1. Alkyd Option:
 - a. Vehicle: Alkyd resins, thinners and additives.
 - b. Pigments: Titanium dioxide and reinforcing pigments.
 - c. Solids by Volume: 44 percent minimum.
 - d. Solvent Type: Paint thinner.
 - e. Resin Type: Alkyd.
 - 2. Acrylic Option:
 - a. Vehicle: Acrylic resins, water and additives.
 - b. Pigments: Titanium dioxide, reinforcing, and corrosion inhibiting pigments.
 - c. Solids by Volume: 38 percent minimum.
 - d. Solvent Type: Waterborne.
 - e. Resin Type: 100 percent acrylic.
- E. Primer for exterior wood fascia and trim shall contain or have properties which are equivalent to the following:
- 1. Vehicle: Acrylic resins, water and additives.
 - 2. Pigments: Titanium dioxide.
 - 3. Solids by Volume: 39 percent minimum.
 - 4. Solvent Type: Waterborne.
 - 5. Resin Type: 100 percent acrylic.
- F. Primer for interior wood surfaces, and for gypsum wallboard surfaces receiving an epoxy coating, shall contain or have properties which are equivalent to the following:
- 1. Vehicle: Acrylic resins, water and additives.
 - 2. Pigments: Titanium dioxide and reinforcing pigments.
 - 3. Solids by Volume: 43 percent minimum.
 - 4. Solvent Type: Waterborne.
 - 5. Resin Type: 100 percent acrylic.

- G. Fire retardant alkyd undercoater designed to provide excellent sealing, adhesion, and enamel holdout; primer on new wood surfaces and an intermediate coat on previously sealed wood surfaces; shall contain or have properties which are equivalent to the following:
1. Vehicle: Alkyd resins, thinners and additives.
 2. Pigments: Titanium dioxide (TiO₂) and reinforcing pigments.
 3. Solids by Volume: 54 percent ±2 percent minimum.
 4. Solvent Type: Paint Thinner
 5. Resin Type: Alkyd.
- H. Sealer for interior gypsum board receiving an acrylic paint finish shall contain or have properties which are equivalent to the following:
1. Vehicle: Vinyl acrylic resins, water and additives.
 2. Pigments: Titanium dioxide and reinforcing pigments.
 3. Solids by Volume: 37 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: Acrylic copolymer.
- I. Low-sheen paint for exterior wood fascia and trim shall be formulated for exterior applications and shall contain or have properties which are equivalent to the following:
1. Vehicle: Acrylic resins, water and additives.
 2. Pigments: Titanium dioxide and reinforcing pigments.
 3. Solids by Volume: 40 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: 100 percent acrylic.
- J. Flat paint for exterior cement plaster wall surfaces shall be formulated for exterior applications and shall contain or have properties which are equivalent to the following:
1. Vehicle: Acrylic resins, water and additives.
 2. Pigments: Titanium dioxide and reinforcing pigments.
 3. Solids by Volume: 35 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: 100 percent acrylic.
- K. Line striping coating for exterior asphalt and concrete roads, walkways, curbs, parking lots, and other areas as indicated, shall be formulated for exterior applications and shall contain or have properties which are equivalent to the following:
1. Vehicle: Acrylic and epoxy resins, water and additives.
 2. Pigments: Titanium dioxide and reinforcing pigments.
 3. Solids by Volume: 39 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: Acrylic/epoxy.
- L. Eggshell paint for interior wall and ceiling surfaces where indicated, and miscellaneous interior wood components where indicated shall be formulated for interior applications and shall contain or have properties which are equivalent to the following:
1. Vehicle: Acrylic resins, water and additives.
 2. Pigments: Titanium dioxide and reinforcing pigments.
 3. Solids by Volume: 40 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: 100 percent acrylic.

- M. Semi-gloss paint for interior wall and ceiling surfaces where indicated, and miscellaneous interior wood components where indicated shall be formulated for interior applications and shall contain or have properties which are equivalent to the following:
 1. Vehicle: Acrylic resins, water and additives.
 2. Pigments: Titanium dioxide.
 3. Solids by Volume: 37 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: 100 percent acrylic.

- N. Latex flat enamel for interior wall and ceiling surfaces where indicated shall be formulated for interior applications and shall contain or have properties which are equivalent to the following:
 1. Vehicle: Vinyl acrylic resins, water and additives.
 2. Pigments: Titanium dioxide and reinforcing pigments.
 3. Solids by Volume: 42 percent minimum.
 4. Solvent Type: Waterborne.
 5. Resin Type: Acrylic copolymer.

- O. Gloss enamel paint for interior wall and ceiling surfaces where indicated, and for mechanical and electrical equipment and/or enclosures, shall be formulated for interior and exterior applications and shall contain or have properties which are equivalent to the following:
 1. Vehicle: Alkyd resins, thinner and additives.
 2. Pigments: Titanium dioxide.
 3. Solids by Volume: 52 percent minimum.
 4. Solvent Type: Paint thinner.
 5. Resin Type: Alkyd.

- P. Gloss and semi-gloss epoxy coatings for interior wall and ceiling surfaces shall be two component, and shall contain or have properties which are equivalent to the following:
 1. Vehicle: Epoxy and polyamine resins, water and additives.
 2. Solids by Volume: 50 percent minimum.
 3. Solvent Type: Waterborne.
 4. Resin Type: Epoxy

- Q. Fire Retardant Alkyd Semi-Gloss Enamel for telecommunications terminal backboard (TTB).
 1. Vehicle: Alkyd resins, thinner and additives.
 2. Pigments: Titanium dioxide (TiO₂) and reinforcing pigments.
 3. Solids by Volume: 55 percent ±2 percent minimum.
 4. Solvent Type: Paint Thinner
 5. Resin Type: Alkyd

- R. Additional surface preparation and paint materials required by other Sections and not listed herein shall be manufacturer's best quality for the intended purpose.

2.5 PAINT MATERIALS FOR EXTERIOR USE

A. Primers and Undercoats:

Product

Acrylic Masonry Primer/Sealer
 Acrylic Multi-Purpose Primer
 Acrylic Wood Primer (Exterior)

Dunn-Edwards

Product / Number

Eff-Stop Premium ESPR00
 M-P Prime W 713
 E-Z Prime EZPR00

Galvanized/Aluminum Primer
White Alkyd Corrosion Inhibitive Primer

Galv-Alum QD 43-7
Bloc-Rust BRPR00-1 Series

B. Paint Finish Coats:

Product

100 percent Acrylic Gloss Paint (Int./Ext.)
100 percent Acrylic Low Sheen Paint (Exterior)
100 percent Acrylic Semi-Gloss Paint (Int./Ext.)
100 percent Acrylic Wood and Masonry Flat Paint (Ext.)
Line Striping Coating

Dunn-Edwards

Product / Number

Spartashield SSSL60
Spartashield SSSL30
Spartashield SSSL50
Spartashield SSSL10
Vin-L-Stripe W 801-1

2.6 PAINT MATERIALS FOR INTERIOR USE

A. Primers and Undercoats:

Product

Acrylic Enamel Undercoater (Interior)
Acrylic Masonry Primer Sealer
Acrylic Multi-Purpose Primer
Alkyd Pigmented Sealer (Interior)
Concrete Block Filler, Smooth
Galvanized/Aluminum Primer
Pigmented Sealer (Interior)
Two Component Epoxy Masonry Primer
White Alkyd Corrosion Inhibitive Primer

Dunn-Edwards

Product / Number

Unikote W 707
Eff-Stop W 709
M-P Prime W 713
Aristowall AWLL
Smooth Blocfil SBSL00
Ultra-Grip Premium UGPR00-1
Vinylastic Select VNSL00
Smooth Blocfil Premium SBPR00
Bloc-Rust BRPR00-1 Series

B. Paint Finish Coats:

Product

100 percent Acrylic Eggshell Paint (Interior)
100 percent Acrylic Eggshell Paint (Int./Ext.)
100 percent Acrylic Gloss Paint (Interior/Exterior)
100 percent Acrylic Semi-Gloss Paint (Interior)
100 percent Acrylic Semi-Gloss Paint (Int./Ext.)
Latex Flat Enamel (Interior)
Quick-Dry Alkyd Gloss Enamel

Dunn-Edwards

Product / Number

Spartawall SWLL30
Spartawall SWLL30
Spartashield SSSL60
Spartawall SWLL50
Permasheen W 901
Spartawall SWLL10
Galv-Alum Premium GAPR00

C. Epoxy Coatings:

Product (distributed by Dunn-Edwards)

Gloss Waterborne Epoxy

Dunn-Edwards

Product / Number

Intergard I 735

D. Fire Retardant Coatings:

Product (distributed by Dunn-Edwards)

Interior Fire Retardant Alkyd Enamel Undercoater

Interior Fire Retardant Alkyd Semi-Gloss Enamel

Dunn-Edwards

Product / Number

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2.7 COLORS

- A. The Owner Representative will select the finish colors and textures and determine the basic colors of surfaces to be painted or stained.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the application of paint and stain finishes.
- B. Before commencing paint applications, have an authorized representative of paint manufacturer inspect work areas and report his findings.
- C. If unsatisfactory conditions exist, do not commence the application until such conditions have been corrected.
- D. Application of first coat of finish constitutes acceptance of surface conditions and responsibility for ultimate finish.

3.2 PREPARATION

- A. Rooms and spaces shall be broom-clean before commencement of paint application.
- B. Surfaces to be finished shall be dry, clean, smooth, and free from rust, scale, oil, grease, grit, frost, sap, and other foreign matter. Shellac and seal marks which might bleed through surface finish.
- C. Protect nameplates, switchplates, instruments, gauges, stainless steel, aluminum, and other surfaces which are not to be painted by masking or other means.
- D. Hardware, hardware accessories, lighting fixtures, and similar items in place shall be sufficiently protected or removed prior to painting, and replaced upon completion of painting of each space.
- E. Disconnect heating and other equipment adjacent to walls, and move to permit wall surfaces to be painted. Following completion of painting, replace and reconnect equipment.
- F. Locate and install scaffolding and staging to avoid interference with the Work of other Sections.

- G. Wood:
1. Clean soiled surfaces. Sand smooth and dust clean. Neatly fill nail holes, cracks, and depressions with filler. When dry, sand flush and smooth.
 2. Before finishing, exposed portions shall have handling marks or effects of exposure to moisture removed with a thorough, final sanding over surfaces of the exposed portions, using at least 150 grit or finer sandpaper, and shall be cleaned before applying sealer or finish.
- H. Gypsum Wallboard:
1. Fill narrow, shallow cracks and small holes with general purpose filler.
 2. Rake deep, wide cracks and deep holes. Fill with thin layers of general purpose filler.
 3. Allow fill material to dry.
 4. Sand smooth after drying. Do not raise nap of paper on wallboard.
- I. Concrete:
1. Clean concrete surfaces with a solution of trisodium phosphate or as recommended by the paint system manufacturer.
 2. Remove grease and oils.
 3. Grout clean interior concrete surfaces receiving alkyd paint or epoxy coating, in accordance with Section 03 30 00.
 4. Prime interior concrete surfaces to be painted. When primer is dry, fill holes, depressions, and pits with cementitious filler. Spot prime filler, when dry, with an additional coat of primer.
- J. Ductwork Interiors: Clean visible portion of ductwork interiors with solvent and wipe clean.
- K. Cement and/or Gypsum Plaster: Using the PH pencil test for surface alkalinity, verify that the PH of the surface to be painted is within manufacturer's recommended PH range prior to application. Correct unsatisfactory conditions per paint manufacturer's recommendations.

3.3 APPLICATION

- A. Do not apply initial coating until moisture content of surface, as tested with a moisture meter, is within limitations recommended by the coating manufacturer.
- B. Apply coatings in accordance with manufacturer's printed instructions.
- C. Methods of Application: Brush (B), Roller (R) or Spray (S) application shall be used in accordance with the following schedule:

<u>Surface</u>	<u>1st Coat</u>	<u>2nd Coat</u>	<u>3rd Coat</u>
Non-Ferrous Metal*			
Primed	----	B, R, S	B, R, S
Unprimed	B, S	B, R, S	B, R, S
Gypsum Wallboard	R, S	R, S	R, S
Wood*			
Primed	----	B	B
Unprimed	B	B	B
Cement Plaster	R, S**	R, S	R, S

* Does not apply to large wall surfaces. Use sheepskin daubers to reach surfaces which are inaccessible to brushes.

** Back-roll first coat when using a spray application.

- D. Coats:
1. Apply coats and undercoats in accordance with the manufacturer's recommendations. A uniform and opaque painted finish utilizing at least three coats is the minimum requirement. More coats of paint may be required to obtain a finish acceptable to the Owner Representative.
 2. Tint pigmented undercoats to approximately the same shade as the final coat. Perceptibly increase the depth of shade in successive coats.
 3. Allow each coat to thoroughly dry before application of succeeding coat; comply with manufacturer's recommendations for drying time between coats.
 4. Sand and dust between each coat to remove defects visible from a distance of 5 feet.
 5. Finish coats shall be smooth, even and free from brush marks, streaks, laps and pile-up of paints, and skipped and missed areas.
 6. Finish mill and shop primed items with materials compatible with prime coat.
 7. Paint surfaces of galvanized steel drip moldings, reveal joints and trim, and casing beads that will be exposed in the finished Work.
- E. Leave parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.
- F. Edges of paint adjoining other materials and colors shall be clean and sharp with no overlapping.
- G. Refinish whole surfaces where portion of finish is not acceptable.
- H. Pretreatment of Existing Surfaces: Unless specified first coat is suitable for materials and conditions encountered, apply one additional coat of surface conditioner as recommended by paint manufacturer.
- I. Priming:
1. Wood
 - a. Prime or stain and seal wood surfaces.
 - b. Apply prime coat to edges, ends, face, underside, and back side of wood to be exposed in the finished Work, including telephone and electric backboards.
 2. Metals:
 - a. Prime surfaces of miscellaneous iron and steel not embedded in concrete, and surfaces of ungalvanized, unprimed sheet steel.
 - b. Time lapse between priming and application of second coat shall be as short as possible to provide for proper bonding to prime coat.
- J. Spraying:
1. Spray only with airless sprayer.
 2. Apply in fine, even spray without addition of thinner.
 3. When necessary, follow by brushing to ensure uniform coverage and to eliminate wrinkling, blistering, and air holes.
 4. If spraying becomes detrimental to equipment or objectionable to personnel, brush painting will be required.
- K. Exposed Plumbing, Mechanical, and Electrical Items:
1. Finish exposed items without factory finish to match adjacent finished surfaces, unless otherwise directed. Where adjacent surface is unfinished, color will be selected by the Owner Representative.

2. Finish shop primed and/or factory primed items to match adjacent finished surfaces, unless otherwise directed. Where adjacent surface is unfinished, color will be selected by the Owner Representative.
 3. Wash exposed metal with solvent, then prime and paint as scheduled.
 4. Spray-paint wherever practicable.
 5. Exposed mechanical and plumbing items that require painting include but are not limited to the following:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible surfaces behind vents, registers, and grilles, which shall be painted flat black. When ductwork is exposed, and not otherwise required to be painted, the interior portion of ductwork behind vents, registers, and grilles is not required to be painted.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - h. Access panels.
 6. Exposed electrical items that require painting include but are not limited to the following:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
 - d. Conduit.
 - e. Access panels.
- L. Miscellaneous Painting: Perform as indicated or required and as directed to coordinate appearance and/or color of incidental items or surfaces with adjacent surfaces.
- M. Touch-up and restore finish where damaged.
- N. When complete, painted surfaces shall be clean, uniform in appearance, and free from holidays, skips, runs, bubbles, streaks, scratches, and other damage and defects.
- 3.4 PROTECTION
- A. Provide barriers and post signs as necessary to protect newly applied finishes.
- 3.5 CLEANING
- A. Clean up spilled and spattered paint daily.
- B. Remove spilled and spattered paint, taking care not to mar surface finish of item being cleaned.
- C. Leave the Project site in a clean and orderly condition.
- 3.6 PAINT SYSTEMS

- A. Paint all exterior and interior surfaces not specifically excluded.
- B. Only major areas are scheduled, but all miscellaneous items and areas within the room or space shall be painted.
- C. The number of coats specified is the minimum number acceptable. If full coverage is not obtained with the specified number of coats, apply additional coats as necessary to produce the required finish, at no increase in Contract Price.
- D. Acceptance of Final Colors: Final coat of paint for both exterior and interior shall not be applied until the colors have been accepted by the Owner Representative.

3.7 SCHEDULE - ITEMS NOT TO BE PAINTED

- A. Do Not Paint the Following Items:
 - 1. Products having factory finish (products which are shop or factory primed only shall be painted).
 - 2. Concrete floors with chemical hardener finish.
 - 3. Exterior concrete paving, curbs, gutters, and walks.
 - 4. Pre-finish or factory finished floor, wall and ceiling materials.
 - 5. Plastic laminate-covered surfaces.
 - 6. Copper, stainless steel, aluminum, brass, bronze and chromium-plated surfaces.
 - 7. Elastomeric materials.
 - 8. Glass, glazing compound and sealants.
 - 9. Finish hardware, unless otherwise indicated (hardware which is shop or factory primed only shall be painted).
 - 10. Roofing finishing materials.
 - 11. Concealed construction such as wall surfaces, mechanical and electrical systems within suspended ceiling spaces, wall shafts, chases and furred spaces.
 - 12. Name plates.
 - 13. UL Labels, fusible links, sprinkler heads.
 - 14. Gauges, thermometers and other recording devices.
 - 15. Moving parts of mechanical equipment such as shafts and valve stems.
 - 16. Lighting fixtures.
 - 17. Plumbing fixtures.
 - 18. Other items specifically indicated not to be painted.

3.8 SCHEDULE - EXTERIOR PAINT SYSTEMS

- A. Wood Fascia and Trim:
 - 1. First Application: Exterior acrylic wood primer.
 - 2. Second Application: Exterior 100 percent acrylic low sheen paint.
 - 3. Third Application: Exterior 100 percent acrylic low sheen paint.
- B. Cement Plaster:
 - 1. First Application: Acrylic masonry primer sealer.
 - 2. Second Application: Exterior 100 percent acrylic wood and masonry flat paint.
 - 3. Third Application: Exterior 100 percent acrylic wood and masonry flat paint.

3.9 SCHEDULE - INTERIOR PAINT SYSTEMS

- A. Mechanical and electrical equipment and/or enclosures - machinery enamel (including mechanical equipment, machinery and appliances, motors, starters and control equipment such as pumps, compressors, fans, unit heaters, ventilation and air conditioning units excluding machine parts, and cabinets and enclosures):
 - 1. First Application: White alkyd corrosion inhibitive primer (galvanized/aluminum primer on galvanized surfaces).
 - 2. Second Application: Quick-dry alkyd gloss enamel.
 - 3. Third Application: Quick-dry alkyd gloss enamel.

- B. Gypsum wallboard wall and ceiling surfaces indicated as semi-gloss finish (for second and third applications in toilet rooms, and janitor rooms, apply interior/exterior 100 percent acrylic semi-gloss paint):
 - 1. First Application: Interior pigmented sealer.
 - 2. Second Application: Interior 100 percent acrylic semi-gloss paint.
 - 3. Third Application: Interior 100 percent acrylic semi-gloss paint.

- C. Gypsum wallboard wall and ceiling surfaces indicated as eggshell finish (for second and third applications in kitchens and adjoining support areas, dining rooms, dishwashing rooms, health service and health service support areas, toilet rooms, and janitor rooms, apply interior/exterior 100 percent acrylic eggshell paint):
 - 1. First Application: Interior pigmented sealer.
 - 2. Second Application: Interior 100 percent acrylic eggshell paint.
 - 3. Third Application: Interior 100 percent acrylic eggshell paint.

- D. Exposed wood, including doors, cabinets, trim, baseboards, and miscellaneous components in areas receiving a semi-gloss finish (for second and third applications in kitchens and adjoining support areas, dining rooms, dishwashing rooms, health service and health service support areas, toilet rooms, and janitor rooms, apply interior/exterior 100 percent acrylic semi-gloss paint):
 - 1. First Application: Interior acrylic enamel undercoater.
 - 2. Second Application: Interior 100 percent acrylic semi-gloss paint.
 - 3. Third Application: Interior 100 percent acrylic semi-gloss paint.

- E. Plywood: Telecommunications terminal backboard (TTB); apply fire retardant paint system to delay ignition and flame spread.
 - 1. First Application: Interior Fire Retardant Alkyd Enamel Undercoater.
 - 2. Second Application: Interior Fire Retardant Alkyd Semi-Gloss Enamel.
 - 3. Third Application: Same as for Second.

- F. Exposed wood, including doors, cabinets, trim, baseboards, and miscellaneous components in areas receiving an eggshell finish, or which are not otherwise specified and not specifically excluded (for second and third applications in kitchens and adjoining support areas, dining rooms, dishwashing rooms, health service and health service support areas, toilet rooms, and janitor rooms, apply interior/exterior 100 percent acrylic eggshell paint):
 - 1. First Application: Interior acrylic enamel undercoater.
 - 2. Second Application: Interior 100 percent acrylic eggshell paint.
 - 3. Third Application: Interior 100 percent acrylic eggshell paint.

END OF SECTION

APPENDIX A

LIST OF DRAWING SHEETS

<u>SHEET NO.</u>	<u>SHEET TITLE</u>
G0.0	TITLE SHEET
G0.1	3D VIEWS
C0.1	CIVIL NOTES
C1.0	DEMOLITION PLAN
C2.0	GRADING AND DRAINAGE PLAN
C2.1	CIVIL SECTIONS & DETAILS
C3.0	UTILITY PLAN
C4.0	EROSION CONTROL
L1.0	LANDSCAPING AND TEMPORARY IRRIGATION
L2.0	PLANTING NOTES AND DETAILS
L3.0	IRRIGATION NOTES AND DETAILS
A0.0	ARCHITECTURAL ABBREVIATIONS
A0.1	ARCHITECTURAL SYMBOLS & NOTES
A1.1	ARCHITECTURAL SITE PLAN
A1.2	ARCHITECTURAL SITE DETAILS
A1.3	ADD ALTERNATE TRELLIS PLAN & DETAILS
A2.1	FLOOR PLAN
A2.2	REFLECTED CEILING PLAN
A2.3	ROOF PLAN
A3.1	EXTERIOR ELEVATIONS
A3.2	INTERIOR ELEVATIONS
A4.1	BUILDING SECTIONS

A5.1	ARCHITECTURAL DETAILS
A5.2	CEILING DETAILS
A5.3	SIGNAGE DETAILS
A5.4	CASEWORK DETAILS
A6.1	DOOR & WINDOW SCHEDULES
S0.1	STRUCTURAL NOTES
S1.1	TYPICAL WOOD DETAILS
S1.2	TYPICAL WOOD DETAILS
S1.3	TYPICAL WOOD DETAILS
S1.4	TYPICAL WOOD DETAILS
S2.1	FOUNDATION PLAN
S2.2	ROOF FRAMING PLAN
S3.1	STRUCTURAL DETAILS
M0.1	MECHANICAL ABBREVIATIONS & NOTES
M0.2	MECHANICAL SYMBOLS
M0.3	MECHANICAL EQUIPMENT SCHEDULE
M2.1	MECHANICAL PLAN
M5.1	MECHANICAL DETAILS
M5.2	MECHANICAL DETAILS
P0.1	PLUMBING ABBREVIATIONS & SCHEDULES
P0.2	PLUMBING SYMBOLS
P2.1	PLUMBING FLOOR PLAN
E0.1	ELECTRICAL ABBREVIATIONS & NOTES
E0.2	ELECTRICAL SYMBOLS
E2.1	POWER & DATA PLAN
E2.2	LIGHTING PLAN & FIXTURE SCHEDULE

E2.3	SIGNAL PLAN
E5.1	ELECTRICAL PANEL SCHEDULE & 1-LINE DIAGRAM
E5.2	PANEL SCHEDULES
E7.0	ELECTRICAL DETAILS
T-1	LOW VOLTAGE PLAN
T-24	CALGREEN CHECKLIST AND ENERGY CALCS

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SECTION 101400

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Interior resin-coated vinyl signs.
 - 2. Safety signs.
- B. Related Sections
 - 1. Section 09 90 00 - Painting and Coating.
 - 2. Section 10 14 36 - Non-Illuminated Exterior Signs

1.2 REGULATORY REQUIREMENTS

- A. Accessibility - Perform the Work in accordance with the 2010 California Building Code (CBC), Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Funded Housing.
- B. Identification of Parking Spaces for off-Street Parking Facilities:
 - 1. Each parking space reserved for persons with disabilities shall be identified by a reflectorized sign permanently posted immediately adjacent to and visible from each stall or space, consisting of the international symbol of accessibility in white on dark blue background.
 - 2. The sign shall not be smaller than 70 square inches in area and installed no lower than 80-inches in the path of travel from the bottom of the sign to the finished walking surface.
 - 3. Spaces complying with CBC 1129B.4 shall have additional sign stating:
 - a. "Van accessible" mounted below the symbol of accessibility where applicable.
 - b. \$250 minimum fine below sign listed in b.

1.3 SUBMITTALS

- A. Submit under provisions of Sections Division 1.
- B. Samples: Furnish samples showing construction of signs, including thickness, colors, and sample lettering.
- C. Shop Drawings
 - 1. Submit schedule showing location and type of sign to be installed.
 - 2. Indicate attachment method for each sign; include detail for each sign to be mechanically attached.
- D. Warranty: Special warranty specified in this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Provide factory wrapping, packaging, and other means necessary to prevent damage or deterioration during shipment, handling, and storage, in accordance with Division 1.
- B. Maintain protective coverings in place and in good repair until removal is necessary for the Work.
- C. Store products inside enclosed storage facilities or inside buildings, above grade.
- D. Maintain storage spaces and products in dry condition at all times.
- E. Protect products against damage during field handling and installation.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: years from date of Project completion.

PART 2 PRODUCTS

2.1 RESIN COATED VINYL (RCV) SIGNS

- A. Manufacturers
 - 1. ASI Sign Systems, Inc.- Modulex.
 - 2. Allen Industries.
 - 3. Best Sign Systems.
- B. Lettering: Ultraviolet-resistant vinyl; pressure-sensitive; 3.5-mil thickness; carrier mounted; size as indicated in the schedule, 5/8-inch minimum to 2-inch maximum height.
- C. Symbols: Vinyl; pressure-sensitive; 3.5-mil thickness; carrier mounted; size as indicated in the schedule.
- D. Finish: Resin Coating Manufacturer's standard.

2.2 POSTS

- A. Nominal two and half inch diameter size, galvanized sleeve (2.469" inside diameter) when signage is in walking surface.
- B. Minimum size footing: 12" diameter x 2'-0" deep, set post 3" from the bottom of the footing.

2.3 METAL SIGN PANELS

- A. Parking accessibility identification signage per code as shown in the drawing.
- B. Manufacturers
 - 1. Best Sign Systems.
- C. Minimum 20-gauge steel or minimum 0.032-gauge aluminum.
- D. Lettering and Numeral Style: Helvetica Medium; upper case unless otherwise indicated.
- E. Characters and symbols: shall contrast with sign background; black characters and symbols on white background, and white characters and symbols on medium blue background in accordance with Accessibility requirements.
- F. Finish: Non-glare, baked enamel.

2.4 ACCESSORIES

- A. Mounting Adhesive: Two component epoxy.
- B. Mounting Posts for Safety Signs: Galvanized steel or aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are satisfactory for the installation of signs. Notify the Owner's Representative, in writing, of any conditions requiring corrective action.
- B. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Protect adjacent existing and newly placed construction and finishes as necessary to prevent damage during installation of this Work.

3.3 INSTALLATION

- A. Install signs after surfaces are finished, in locations as shown on the Drawings.
- B. Install signs square, plumb and level, accurately aligned to position intended, and securely anchored to prevent movement as indicated on the approved shop drawings.
- C. Resin Coated Vinyl Signs: After installation of vinyl letters and symbols, mask area around vinyl to provide minimum 1/4-inch wide border all around; apply resin coating to area within mask to minimum thickness of 4.0 mils, level.

3.4 POST INSTALLATION

- A. Excavate post holes to the depth required to accommodate posts.
- B. Place posts in holes excavated in the ground.
- C. Backfill space around posts to finished ground surface.
- D. Dispose of excess excavated material as directed by the Owner's Representative.

3.5 TOLERANCES

- A. Posts: Plumb to within a tolerance of 0.02 feet in ten feet.

3.6 CLEANING

- A. Clean and polish.
- B. Exposed surfaces shall be clean and free from scratches, dents, tool marks, stains, discoloration, and other defects and damage.

3.7 SCHEDULE

END OF SECTION

SECTION 101433

ILLUMINATED PANEL SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Self-luminous signage and accessories.

1.2 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Product Data:
 - 1. Indicate products, materials, finishes, fasteners, and anchorage devices.
 - 2. Submit manufacturer's data and forms relating to health and regulatory requirements.
- C. Submit manufacturer's installation instructions.
- D. Submit Operation and Maintenance Data
 - 1. Include cleaning and stain removal methods and recommended cleaning materials, polishes, and waxes.
- E. Warranty: Special warranty specified in this Section.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum 3 years documented experience.
- B. Installer: Approved by manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Provide factory wrapping, packaging, and other means necessary to prevent damage or deterioration during shipment, handling, storage, in accordance with Division 1.
- B. Maintain protective coatings and coverings on units until installation is complete.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: 5 years from date of Project completion.

PART 2 PRODUCTS

2.1 SIGNS

- A. Self-Luminous Exit Signs: Illuminated by non-nuclear material.
 - 1. Manufacturers
 - a. Active Safety.
 - b. Approved Equal.

2.2 ACCESSORIES

- A. Mounting Brackets and Hardware: Manufacturer's standard type designed for specified sign.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and openings are ready to receive the Work.
- B. Verify field measurements.
- C. Do not begin installation until unsatisfactory conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install signs in accordance with manufacturer's written instructions, and as indicated on the approved shop drawings.
- B. Install at locations indicated, at spacing and heights required by applicable codes unless otherwise indicated.
- C. Set signs plumb, level, accurately aligned, and securely attached.
- D. Unless otherwise specifically permitted by manufacturer's instructions:
 - 1. Do not drill sign.
 - 2. Use only mounting brackets provided by the manufacturer.
 - 3. Use only screws approved or provided by the manufacturer to mount the sign to the mounting brackets.

3.3 CLEANING

- A. Remove protective coverings and coatings.
- B. Clean signs in accordance with manufacturer's instructions, leaving exposed surfaces free from damage, scratches, dents, tool marks, stains, discoloration, and other defects and damage.
- C. Do not damage or deface manufacturer's labels affixed to signs.

END OF SECTION

SECTION 102800

TOILET, BATH, AND JANITORIAL ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Toilet and janitorial accessories.
 - 2. Attachment hardware.
- B. Related Sections
 - 1. Section 07 90 0 - Joint Protections.
 - 2. Section 08 80 00 - Glazing: Mirrors.

1.2 REFERENCES

- A. ADAAG - Americans with Disabilities Act Accessibility Guidelines.
- B. ANSI A117.1 – Guidelines for Accessible and Useable Buildings and Facilities.
- C. ASTM International (ASTM)
 - 1. ASTM A123-09 - Zinc (Hot-Dip Galvanized) Coatings on Iron or Steel.
 - 2. ASTM A167-09 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - 3. ASTM A269-08 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 4. ASTM A1008-09 - Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy & High Strength Low Alloy with Improved Formability.
 - 5. ASTM B456-09 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- D. CCR - California Code of Regulations.
- E. NEMA LD-3 - High Pressure Decorative Laminates.

1.3 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Submit manufacturer's catalog data complete with descriptions of materials, finishes, fastening and anchoring devices. Indicate specified options and accessories.
- C. Shop Drawings:
 - 1. Plans: Locate each specified unit in project.
 - 2. Elevations: Indicate mounting height of each product.
 - 3. Details: Indicate anchoring and fastening details, required locations and types of anchors and reinforcement, and materials required for installation of specified products.
- D. Manufacturer's installation instructions.

- E. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Conform to applicable requirements of CCR, Title 24, Part 2, for provisions for the physically handicapped; materials and installation.
- B. Design Criteria: Grab bars shall be capable of withstanding a point load, shear and tensile force of 250 pounds, minimum, when installed in accordance with the manufacturer's instructions.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Attach quality designation and guarantee label to each mirror, or submit manufacturer's certification that mirrors meet specified requirements.
- B. Maintain protective coatings or coverings on units until installation is complete.

1.6 SPECIAL WARRANTY REQUIREMENTS

- A. Provide Warranty in accordance with Division 1.
- B. Dryers: Furnish manufacturer's 10 year limited warranty.
- C. Mirrors: Furnish manufacturer's 15 year limited warranty against silver spoilage for first quality glass mirrors which are triple-silvered and electro-copper plated with baked enamel backing.

PART 2 PRODUCTS

2.1 MANUFACTURERS - SCHEDULED ACCESSORIES

- A. Individual items and acceptable manufacturers are indicated in the schedule at the end of this Section.
- B. Grab bars indicated on the Drawings as 12 guage are custom fabricated.
- C. Unless otherwise specified, furnish and install component units with trims and accessories necessary for a complete installation.
- D. Subject to conformance with requirements, the following manufacturers are acceptable:
 - 1. Bobrick.
 - 2. American Specialties, Inc. (ASI).
 - 3. Bradley.
 - 4. General Accessory Manufacturing Company (GAMCO).
 - 5. McKinney Parker.

2.2 MATERIALS

- A. Stainless Steel: ASTM A167, Type 304 or 316; minimum 28 gage.
- B. Miscellaneous Accessories: As required for complete installation.

2.3 ATTACHMENT DEVICES

- A. Grab Bar Mounting Kits:
 - 1. Concealed Mounting: Type recommended by the manufacturer of the grab bars for the surface to which bars will be mounted.
 - 2. Welded Mounting: Stainless steel plate with threaded rod.
- B. Fasteners, Screws, and Bolts
 - 1. Size and type best suited for intended application.
 - 2. Exposed Fasteners: Provide oral head fasteners with finish matching the accessory.
- C. Trim and Closures: Provide continuous 18 gage stainless steel shims, closures, and trims where accessories are partially mounted on wainscot materials.

2.4 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or joints.
- D. Back-paint components where contact is made with building components to prevent electrolysis.
- E. Shop-assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation.
- G. Hot Dip Galvanize exposed and painted ferrous metal and fastening devices.
- H. Keying: Key all accessories alike; key all coin mechanisms alike, but different from accessories. Provide six keys for accessories and six keys for coin mechanisms to the County.

2.5 FACTORY FINISHING

- A. Galvanizing: ASTM A123 to 1.25 oz/sq yd.
- B. Shop Primed Ferrous Metals: Pre-treat and clean, spray apply one coat primer and bake.
- C. Enamel: Pre-treat to clean condition. Apply one coat primer and minimum two coats baked enamel.
- D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.
- E. Stainless Steel: No. 4 satin luster finish.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that conditions are satisfactory for the installation of accessory items.
- B. Verify instructions are as recommended by manufacturer.
- C. Verify that supports and reinforcements are in place and proper for accessory installation.
- D. Do not begin installation until conditions are satisfactory. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site at the appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions. Mounting heights and locations shall be in conformance with ADAAG and California accessibility standards found in CCR Title 24, Part 2.
- B. Install accessories plumb and level, accurately aligned, and securely attached. Use fasteners where indicated.
- C. Grab Bars:
 - 1. Install grab bars in lengths and locations in conformance with ADAAG, Title 24, and as indicated on Drawings.
 - 2. Install grab bars with concealed mounting in accordance with manufacturer's instructions and as indicated.
 - 3. Secure grab bars located in Inmate Toilet by welding to wall plates as detailed on the Drawings.

3.4 ADJUST AND CLEAN

- A. Remove protective coatings and coverings in accordance with manufacturer's printed instructions.
- B. Exposed surfaces shall be clean and free from scratches, dents, tool marks, stains, discoloration, and other defects and damage.
- C. Adjust accessories for proper operation.
- D. After completion of installation, clean and polish exposed surfaces.

3.5 ACCESSORY SCHEDULE

- A. Men's and Women's Toilet Rooms:
 - 1. Paper Towel Dispensers surface-mounted: Fort James 58553, stainless steel, satin finish.
 - 2. Soap Dispenser Surface-mounted: Bobrick B-2111, stainless steel, satin finish.
 - 3. Recessed Toilet Seat Cover Dispensers: Bobrick B-301, stainless steel, satin finish.

4. Toilet Tissue Dispenser: Royce Rolls Ringer Co. TP-3, TP-lock, stainless steel, satin finish.
5. Sanitary Napkin Disposal (Women's restroom only): Bobrick B-270, stainless steel, satin finish with tumbler lock.
6. Grab Bars: Bobrick B-6809.99-36 and B-6809.99-42. Anchor grab bars on steel plate, secure steel plate to wall studs.
7. Mop Holder: Bobrick B-223x24.

END OF SECTION

Product Tools

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Product Details

IN STOCK?:	NO
WEIGHT:	13 LB
CUBE:	0.52 FT ³
SHIPS:	GROUND

Dispenser Towel Adjustamatc(1) **OUT OF STOCK**

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PRODUCT ID: 58553GPT

RETAIL PRICE: **\$226.78**

OUR PRICE: **\$83.59**

YOU SAVE: **\$143.19 (63%)**

SOLD AS: 1 EA

QUANTITY: [ADD TO CART](#)

[This product usually ships in 1 - 2 Business Days.](#)

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Product Description

CLEAR GREY,VISTA LEVER HRT

Manufacturer Information

NAME:	Fort James
PART NUMBER:	58553GPT
ALTERNATES:	58553GPT

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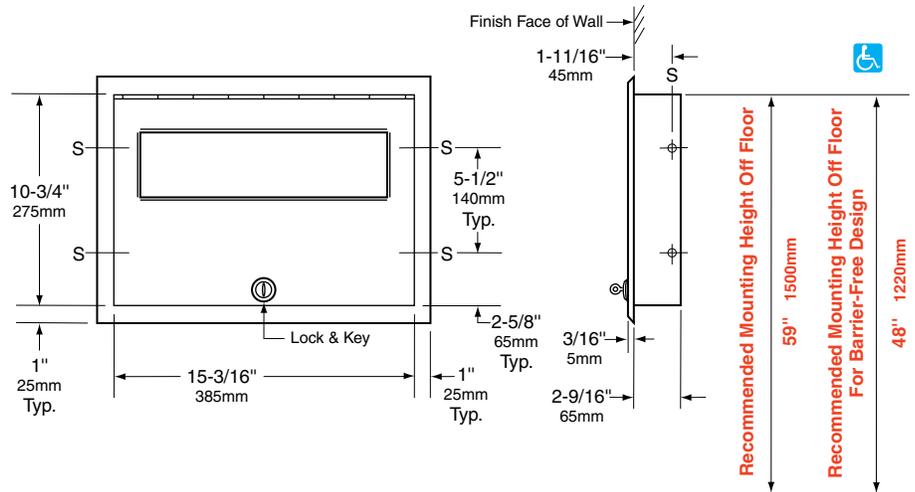




Technical Data

RECESSED TOILET-SEAT-COVER DISPENSER

B-301



Rough Wall Opening
 15-5/8" (395mm) wide
 11-1/4" (285mm) high
 2-5/8" (67mm) minimum
 recessed depth

MATERIALS:

Cabinet — 18-8 S, type-304, heavy-gauge stainless steel. All-welded construction.

Flange — 18-8 S, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Drawn and beveled, one-piece, seamless construction.

Door — 18-8 S, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Secured to cabinet with a full-length, stainless steel piano-hinge. Beveled opening. Equipped with a tumbler lock keyed like other Bobrick washroom accessories.

OPERATION:

Dispenses single- or half-fold paper toilet seat covers. To fill dispenser, door unlocks with key provided. Capacity: 500 toilet seat covers.

INSTALLATION:

Provide framed rough wall opening 15-5/8" wide x 11-1/4" high (395 x 285mm). Minimum recessed depth required from finish face of wall is 2-5/8" (67mm). Allow clearance for construction features that may protrude into rough wall opening from opposite wall. Coordinate with mechanical engineer to avoid pipes, vents, and conduits in wall. Mount cabinet with shims between framing and cabinet at all points indicated by an S, then secure unit with four #8 x 1-1/4" (4.2 x 32mm) sheet-metal screws (not furnished).

SPECIFICATION:

Recessed toilet-seat-cover dispenser shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Flange shall be drawn and beveled, one-piece, seamless construction. Door shall be secured to cabinet with a full-length, stainless steel piano-hinge and equipped with a tumbler lock keyed like other Bobrick washroom accessories. Dispenser shall have a capacity of 500 paper toilet seat covers. Manufacturer's service and parts manual shall be provided to the building owner/manager upon request.

Recessed Toilet-Seat-Cover Dispenser shall be Model B-301 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

SECTION 104400

FIRE PROTECTION ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Fire extinguishers.
 - 2. Accessories.
- B. Related Sections
 - 1. Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- A. CCR - California Code of Regulations, Title 19, Division 1, Chapter 3.
- B. NFPA 10 – Portable Fire Extinguishers

1.3 DEFINITIONS

- A. Wet Areas: Toilet rooms and other areas exposed directly to water or high humidity, including rooms and spaces with ceramic tile or quarry tile finishes.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Provide extinguisher operational features, color and finish, anchorage details.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Division 1.
- B. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements for fire extinguishers.

1.6 QUALITY ASSURANCE

- A. Units listed and approved by UL, and State Fire Marshal.
- B. Provide fire extinguishers, and accessories by single manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 EXTINGUISHERS

- A. Acceptable Manufacturers
 - 1. J. L. Industries.
 - 2. Larsen's.
 - 3. Potter & Roemer.
- B. Dry Chemical Type: Heavy duty steel tank, with pressure gage; UL rating 4A-60BC unless otherwise indicated, corrosion and impact resistant finish.
- C. Extinguishers: Conform to CCR, Title 19, Division 1, Chapter 3.

2.2 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, corrosion resistant finish, size and type to suit extinguisher.

2.3 FINISHES

- A. Steel: Baked enamel finish, red color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify servicing, charging and tagging of fire extinguishers.
- B. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install brackets. Provide bracket for each extinguisher not in cabinet. Mount bracket at a height to result in top of extinguisher at 48 inches above the floor, maximum, unless otherwise indicated.
- C. Place extinguishers. Locate one extinguisher elsewhere as indicated.
 - 1. Provide dry chemical fire extinguishers in all locations.
 - 2. Installed extinguishers shall be fully charged and properly tagged in accordance with requirements of enforcing authorities.

3.3 SCHEDULE

- A. Provide extinguishers of types indicated.

END OF SECTION

SECTION 122000
WINDOW TREATMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Horizontal Window Blinds.

1.2 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Shop Drawings: Indicate operation, size, materials, components, accessories, and installation details.
- C. Product Data: Indicate manufacturer, model, product description, operation, available options.
- D. Samples:
 - 1. Submit samples of manufacturer's standard colors and finishes for selection by the County Representative.
 - 2. Submit two samples 6 inches long indicating each slat material and color selected.
 - 3. Submit two samples 6 inches x 6 inches in size indicating each fabric material and color selected.
- E. Manufacturer's installation instructions.
- F. Contract Closeout Submittals:
 - 1. Operation and Maintenance Data: Include cleaning and stain removal methods and recommended cleaning materials and methods.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years documented experience.
- B. Installer: Company specializing in applying the work of this Section; approved by manufacturer.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame/fuel/smoke ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with Section 01 35 43.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication.

1.7 QUALITY ASSURANCE

- A. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Initial submittals, which do not include the Environmental Certification, below will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.
- B. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100-parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are know problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.

PART 2 PRODUCTS

2.1 HORIZONTAL WINDOW BLINDS

- A. Manufacturers:
 - 1. Levelor.
 - 2. Hunter Douglas
 - 3. Springs Window Fashion
- B. Description:
 - 1. Slats: One inch wide, horizontal, heavy duty aluminum to resist warping and bending.
 - 2. Top and Bottom Rails: Rigid and warp resistant.
 - 3. Arched windows to receive fixed arch top horizontal blinds.
 - 4. Fiberglass door at Sheriff's office to receive fixed horizontal blinds.
- C. Operation: Manual.
 - 1. Slats: Tilt out and in by means of control wand; capable of being raised to the top rail by means of a draw cord.
 - 2. Cord: Terminate in a plastic or nylon end.

2.2 COLORS

- A. Colors will be selected by the County's Representative from manufacturers' standards.
- B. The County's Representative will select a maximum of two color/finish combinations for each type of window treatment.

2.3 ACCESSORIES

- A. Rope: Braided nylon jacket over glass fiber core; minimum breaking strength 200 pounds.

- B. Bead Chain: Stainless steel or nickel plated brass; minimum breaking strength 100 pounds.
- C. Hardware, Trim, Other Accessories: Type and size best suited for intended application.
- D. Window blinds to doors where indicated on plans.

2.4 FABRICATION

- A. Shop Assembly: Fabricate components in the shop to the greatest extent possible for field installation.
- B. Shop/Factory Finishing: Provide selected finishes.
- C. Fabricate components of non-corrosive, non-staining, non-fading materials, completely compatible with each other, not requiring lubrication during normal expected life.
- D. Fabricate units to completely fill openings indicated. For continuous window wall installation, fabricate so that ends occur only over mullions or other defined vertical separations, unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and openings are ready to receive work.
- B. Verify field measurements are as shown on approved shop drawings.
- C. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Protect elements surrounding the work of this Section from damage or disfiguration.

3.3 INSTALLATION

- A. Install window treatment in accordance with manufacturer's instructions.
- B. Isolate metal parts from concrete and mortar to prevent galvanic action.
- C. Anchor in accordance with approved shop drawings. Provide adequate clearance to permit unencumbered operation.
- D. Tolerances:
 - 1. Maximum Variation From Level: 1/4 inch per 10 feet; ¼ inch total.
 - 2. Maximum Variation From True Alignment: 1/16 inch.

3.4 ADJUSTMENT

- A. Adjust window treatment for smooth, even operation.

3.5 CLEANING

- A. Clean window treatment immediately prior to acceptance.
- B. Protect operating mechanisms from intrusion of dirt and debris.

END OF SECTION

SECTION 125651

LIBRARY FURNITURE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Wood shelving and accessories.

1.2 SUBMITTALS

- A. Submit in accordance with Division 1.
- B. Shop Drawings
 - 1. Show plan layout and shelving elevations. Indicate locations of single and double faced shelving, accessory and specialty shelving, seismic anchorage, and other features described in this Section.
- C. Samples
 - 1. Submit samples of manufacturers' standard colors for color selection by the Owner's Representative.

1.3 DESIGN REQUIREMENTS

- A. Seismic Restraint
 - 1. Identify each item requiring seismic restraint installation in accordance with CBC Chapter 16A.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum 3 years documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Highsmith; P.O. Box 7820, Madison, Wisconsin.
- B. Jasper Library Furniture; 694 North Main Street, Troutman, NC 28166
- C. Brodart Library Furniture; 500 Arch Street, Williamsport, PA 17701
- D. Approved Equal

2.2 EQUIPMENT

- A. Wood Shelving: Hardwood shelving units; red oak, maple, or birch species; moisture content of 6 to 8 percent; 36-inch width; depths and heights as indicated; shelves fully adjustable on a 1 inch vertical module and removable. Individual equipment items are indicated in Schedule at the end of this Section.

2.3 ACCESSORIES

- A. Internal Wall Reinforcement: material, size and type in accordance with approved shop drawings.
- B. Miscellaneous Trim and Accessories:
 - 1. Provide end panels, hardware, parts, and accessories required for complete assembly of stand alone and interconnected units.
 - 2. Miscellaneous Trim and Accessories to be in accordance with approved shop drawings
 - 3. Complete installation to be in accordance with approved shop drawings

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and openings are ready to receive Work. Notify the Owner's Representative, in writing, of any conditions requiring corrective action.
- B. Verify field measurements are as shown on Drawings.
- C. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install library furniture in accordance with manufacturer's instructions and approved shop drawings.

3.3 CLEANING

- A. Clean, leaving exposed surfaces free from damage, dents, tool marks, stains, discoloration, and other defects and damage.

END OF SECTION